BULLETIN

MADRAS DEVELOPMENT SEMINAR SERIES

VOLUME II NUMBER 3 MARCH 1972

74, SECOND MAIN ROAD, GANDHINAGAR,
ADYAR, MADRAS-20.

MONTHLY BULLETIN

Vol. II No. 3

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EDITORIAL — SOME HIGH LIGHTS

General Economic Scene :

International :

Defence and Development: With the publication by the major powers of their defence budgets for 1972 and 1973, the disarmament drive has suffered yet another setback. The U.S. arms budget has increased from Rs. 55,080 crores in 1972 to Rs. 61,200 in 1973 in order to equip itself to "meet the growing threat" to its security. A new class of nuclear powered submarine, atomic missiles twice the range of the 4800 km Polaris missile, the development of multi war head models are planned with a view to increasing its security. Their totality for all countries is, however, increasing insecurity. Further the assumption that with the winding down of the Vietnam war, defence expenditures will be diverted to development, has proved illusory. Arms expenditures seem to have their own autonomous existence. The latest United Nations arms survey reports that in the sixties, the countries spent Rs. 13,46,000 crores on arms. The escalating character of this expenditure during a decade in which the major powers, who account for 80 percent of the total expenditure, were not at war with each other is well brought out in the report thus: the arms build up is on the hypothesis of the worst case, that is to say each side designs its arms build up on the assumption that its rival could, if it so decided, be the stronger. Before a new weapon is then completed, the designer is already designing a more effective model which he hopes will not only be more effective in performance but also less vulnerable to defence which the other side might introduce to a new threat. And so it goes, which by the end of the current decade will increase to the incredible sum of Rs. 19,08,000 crores. By contrast the stagnation and decline in aid to development seems a necessary corollary. The International Bank for Reconstruction and Development is still awaiting action by the same major powers on the third replenishment of the small IDA Funds.

Trade and the enlarged Common Market: With the decision in January of the United Kingdom (along with Ireland, Denmark and Norway) to join the European Economic Community, the trade relations of India with the United Kingdom and the Common Market countries need a complete overhaul. The continuation of the textiles agreement referred to in the Vol. II No. 2 issue of the Bulletin is one element which needs clarification, as under the Common Market rules, the Indian textile quota should be duty free. There are two further areas demanding immediate attention and negotiation, particularly in view of the growing importance of our export earnings as aid flows are decreased. The first is our traditional exports to both the United Kingdom and the six Common Market countries. These traditionals comprise tea, spices, leather, tobacco, hides and skins, cashew, lac, jute, coir, oil cakes and mica. These exports which still form the bulk of our export to these countries will come under the high common external tariff of the Common Market, unless we are able to negotiate a comprehensive trade treaty with all the Common Market countries—new and old—including the United Kingdom, to reduce

or eliminate tariff and non-tariff barriers to our exports to these countries. The second area is the non-traditionals like engineering goods, spare parts etc., where the non-tariff barriers like import ceiling and quotas, and product classification must be removed by negotiation and the volume of exports expanded by offer of reciprocal trade advantages to the Common Market countries. In a sense this second area of non-traditionals is even more urgent than the traditional area. The increasing of the country's exports earnings in the future depends on rapid expansion of this volume, for which the initiative in production and salesmanship of industrialists as well as the government is needed.

International Protein Policy: A protein and nutrition policy and programme in every developing country is urged by the C. Subramaniam Panel of United Nations experts. The main outlines of the policy are well known. First the programme should be addressed to the most vulnerable group in each country, which is the pre-school child and the lactating and pregnant mother. Second the major areas for immediate action are cereal protein improvement, greens and vegetable development, village level food processing and consumer education. This is a simultaneous action programme involving research, increased production and education. Third the financing of this programme, which will have to be essentially by each country, calls for special efforts. One such proposal is "a protein development tax" on soft drinks, alcohol, entertainment, sources of energy and luxury travel. Fourth a special earmarked International Fund under the United Nations Development Programme is proposed to support these national programmes particularly on the research side. Finally the National development Plan of each developing country should have a section in national nutrition policy translated into local programmes and projects. It is now necessary to put this proposal into action. There seems to be a good chance that India may be one of the first to do so.

National :

Credit: The credit and fiscal situation is on the buoyant side. Deposit mobilisation is proceeding apace and the increase in commercial banks deposits during 1972 is expected to be around Rs. 1400 crores. The Life Insurance Corporation is also increasing its assets at a faster rate than in 1970-71. Even if bank advances on account of the financing of buffer stocks by the Food Corporation of India, of procurement for Bangla Desh relief and of sugar stocks purchases, etc., are at the same 1971 high level of around Rs. 850 crores rather than the 50 percent lower 1970 advances, there will be somewhere around Rs. 500-600 crores available for investment in the Central and State bonds and loans in public and private sector undertakings and particularly in Plan projects of rural electrification, energisation of pump sets and in the development programmes of the State Electricity Board. To that extent the 3-5 percent reductions in Central assistance to State Plans, to which reference was made in the last issue (Vol. II No. 2) which has been standardised at 3 percent for all States and the decision not to permit overdrafts by States after 1st April, 1972 may not only be compensated by additional investment resources available from the financial institution, but may be a means of making for more financial discipline and business viability, particularly in States which have been using so called Central assistance and overdraft facilities in a somewhat irresponsible manner (See Vol. I No. 9). Under these conditions, the credit policy of the country needs to be reviewed once more. The 1971 credit balance sheet shows four features vis a vis the credit picture

for 1969 and 1970: (a) a greater expansion of money supplies with the public; (b) a larger deposit growth rate, as earlier noted; (c) a significant increase in Government credit which reflects the large 1971 deficit financing aided by the financial imperatives of the Bangla Desh refugees and the Indo-Pakistan war; and (d) a serious slackening in the growth of private sector credit. In the overall deposits, savings, investment and credit prospects for 1972, there is need for fashioning, a policy that will channel more resources into the private sector so that the rate of growth of private sector credit might be commensurate with the expected growth rate of that sector in 1972. Such a policy should ensure decentralized and speedy administrative action by individual banks in the approval of working capital loan application and the rapid turn over of inventories, particularly those dependent on imports.

Tax Revenues : The fiscal front is equally positive. The Central Government total additional receipts for 1971—72 are Rs. 800 crores over those of 1970—71. During the year additional taxation introduced during the May budget presentation amounting to Rs. 220 crores, through ordinances for Rs. 14 crores and through the supplementary budget for Rs. 40 crores (see Vol. I No. 6 and Vol. II No. 1 & 2) provided for a total Rs. 274 crores increase while the actual increase in tax receipts have been Rs. 650 crores. Similarly Rs. 150 crores have been raised additionally in public loans and small savings. With this fiscal buoyancy, there is some hope that the uncovered deficit will be nearer the anticipated Rs. 230 crores for the year rather than the Rs. 400 crores at which it is currently figuring.

Industrial deceleration : Such a forecast will certainly have been realised if there had been no deceleration in industrial production during the year. As to the fact of deceleration, there is now no doubt. The questions raised by the Minister of Industrial Development about the industrial growth rate have been the subject of detailed study by the Economic Times, whose reconstructed index based on 1966, a revised system of weights and published in January confirms the decline in the industrial growth rate of the country. The official index shows a 1970 July—December decline of 0.5 percent compared to the first six months, the Economic Times index shows a 0.9 percent decline. The June 1971 official index was 1.95 percent higher than that of the previous year and the Economic Times index showed a 2.22 percent rise. What matters now is not further discussion or refinement of our tools for measuring growth or lack of growth, but agreeing on measures for promoting and ensuring growth which the fiscal and credit resources make possible and those which the general economic scene high-lights.

Employment and Integrated Planning: One aspect of the complex economic and industrial scene has been the disappointing start of the crash employment programme referred to in Vol. I Nos. 4 and 5 of the Bulletin. Behind the discouraging fact that most States have not been able to use their share of the Rs. 50 crores, despite the identification in each State of the districts and blocks which are backward is the lesson learnt that the crash employment programme is not an isolated relief action; it must be part of the economic and industrial growth programmes of the Fourth Plan with special reference to the backward regions. There is need, therefore, for techno-economic studies in the regions and areas to identify the industries which are appropriate in relation to their resource endowment or inducement and the needed infrastructure—water, roads, sanitation, training, banking and credit. On top there is also need for further feasibility

studies of the industrial activities that have been identified. From this point of view, the lead taken by the Industrial Development Bank of India (IDBI) in both organising itself to help the States to make the necessary techno-economic studies of the backward regions and the further feasibility studies needed, starting with Tamil Nadu (Pondicherry), Mysore (Raichur), and Andhra Pradesh (Telengana), the setting up of interdisciplinary cells in the States to undertake these studies, the organising of training programmes to develop local skills and leaderships to run these projects and the harnessing of the managerial and technical expertise of the private sector—are moves in the right direction and must be supported fully by the States and their various planning and development agencies. A parallel development is the proposal to establish a Central Credit Data Agency which will collect, retrieve and exchange credit information among banks. The Agency will analyse financial statements and undertake market research for areas including the backward areas. This would help in assessing the credit worthiness of existing and new projects, the large and the small borrower, the traditional as well as the neglected sectors. Returning to IDBI, its 1971 performance shows a doubling of its loans and a threefold increase in its programme of industrial assistance. The increased loans and refinance assistance to the export sector, small industries and small transport operators ranged from 50 to 60 percent. Continuing and intensifying this trend in 1972 will lead to both expansion and modernisation of industrial units. The time is now overdue for IDBI and the term lending institutions to establish and make known the criteria and conditions of their loan assitance. The period of adhoc trial and error procedures has now past. This plea for regularising loan and refinance procedures and criteria is repeated once more after six months—see Vol. I No. 7 of the Bulletin.

Need for Increased Resources : The mid term Plan appraisal is still pending in the sense that it is being completed in light of events of the last two months—notably the war and its aftermath and the suspension of U.S. aid. It is a pity that all the labour that went into it and the excellent analysis that it resulted in should have been set aside. The new elements are (a) the costs of the war, (b) the defence needs (c) the suspension of U.S. aid (d) the compensation for flood and war devastation in the border regions, (e) the increased administrative costs and (f) the rehabilitation of Bangla Desh. These may be computed at Rs. 1,500 crores for the last two years of the Fourth Plan. The appraisal shows that to attain the physical targets of the Fourth Plan an additional Rs. 1,300 crores will be needed. The most immediate issue, therefore, arising from the appraisal documents—an issue which is not outdated but which must be faced now, is raising some Rs. 3,000 crores during the next two years—which are also the last two years of the Plan. These resources can be raised from taxes, reduction of consumption and reordering of production priorities all three strong medicine, but they represent action which must now be planned. Another area where the appraisal document continues to be valid is with regard to agricultural policy, where it balances the success in cereals production (5 percent growth) with the shortages in commercial crops and pulses production and the serious short falls in attaining the fertilisers and agricultural machinery targets. These factors point to the kind of changes in agricultural stategy needed for the next two years—intensified cash crops production, prices and procurement policy, establishment of Corporations for major crops and real land reform—atleast doing away with absentee landowners.

Aid: Even on aid, the appraisal document has important pointers. Its computation that rather more external assitance (Rs. 4130 crores) than what was originally

foreseen, will be needed during the Fourth Plan to balance payments and receipts of foreign exchange is a simple statement, possibly an understatement, of fact. Its moral is not that we must negotiate for more aid but that we must export more, import less and reorder our projects. Export earning for 1971-74 is likely to be Rs. 5327 crores and if U.S. non-PL 480 aid of $200 million per year is cut and all other aid continues, aid will amount to Rs. 1,650 crores during this period. Thus our foreign exchange resource will amount to Rs. 6977 crores and our foreign exchange obligations Rs. 8217 crores. (Rs. 1559 crores on debt servicing etc. and Rs. 6658 crores for imports). We face a short fall of Rs. 413 crores a year in our external accounts during the last three years of the plan and the point of the appraisal document surely is a continuing reappraisal and reordering of plan priorities, particularly of the industrial structure, production, licenses issued todate etc. in order to reduce and move away from the production of consumption goods which have a large import content—which are usually luxury goods—and the development of articles of mass consumptions. The cut in U.S. aid and the doctrine of self reliance does not mean a programme of high cost structured import substitution but one of moving away from those lines which are now in demand by the upper and middle classes on to the development of lines of production which meet both the demand for wage goods and where the import constraint is non-existent or minimal. Even for such a transition to reordered industrial priorities, the continuation of aid from other countries and sources is essential. From this point of view the three fresh Yen credits signed with Japan at the beginning of the month covering Tuticorin and Kotah Fertilisers, Cochin Shipyard and commodity loans, and the rescheduling of West German loans and negotiation for increased trading facilities in West Germany are moves which counter the somewhat gloomy forecasts of earlier issues—see Vol. II, No. I and No. 2.

Bangla Desh : The Bangla Desh refugee account is now closing. At the beginning of the month 7 out of 10 million refugees had returned to their homes. The total cost to India of this programme amounts to Rs. 339-45 crores and she has received promise of international assistance for about 50 percent of the total cost. As of December 1971, a little over a quarter (Rs. 53 crores) of the promised assistance has actually been received, mainly from Australia, U.K., Yugoslavia, West Germany, UNICEF and the United Nations Commission for Refugees. The first Indian/Bangla Desh development programme got under way with the signing of the agreement to provide Rs. 25 crores as grant for supply of petroleum and petroleum products, fertilisers, cotton, baby food, oil seeds, cement, steel, chemicals and a long term foreign-exchange loan of £5 million. The decision of the World Bank to undertake an assessment of immediate rehabilitation and development needs of Bangla Desh and the prospects of forming a consortium of countries who will co-operate with the new country in meeting its urgent tasks are a much needed supplementary to India's efforts.

State :

Overdrafts : The decision to stop all State overdrafts from the next fiscal year, which is a necessary and wise move as stated earlier, raises the issue once more sharply in the case of this State. Earlier issues of the Bulletin (Vol. I Nos. 7, 9, 10) have called attention to the problem and suggested remedial action along lines now officially proposed by the Governor in his address to the State Legislature. The position with regard to Centre-State indebtedness is even worse than the debt-servicing problem for the country.

During the Fourth Plan the total loans from the Centre to the State will amount to Rs. 141 crores, while the repayments will be Rs. 155 crores. This kind of reverse aid from the State to Centre must stop and there is a strong case for writing off the Central loans as grants and starting afresh on the basis of a more rational distribution of financial resources as between the Centre and the State.

Urban property ceiling : Another area where action is developing is with regard to urban property ceiling legislation which is in the competence of the States but on which so far State action has been held up for various reasons. On the basis of the request from six State Governments (including the Union territories), a central committee is at work preparing legislation relating to ceiling, taxation and acquisition of excess property, taking into account the parliamentary powers under the 25th amendment. The legislation will also allow for above the ceiling use as in urban areas for low income housing projects and non-profit agencies and for financial and administrative arrangements, including machinery for administering the legislation and the property which is taken over. It is now time for Tamil Nadu to take a position on this important matter. It will be in the interest of the State and its policy of social justice to take over the Central legislation and adapt it to conditions in different urban centres of the State.

National Water Grid: The Ganga-Cauvery grid has been pronounced an engineering feasible project by the United Nations team which will be returning this month to examine the socio-economic preconditions and consequences of the project. This is perhaps one of those cases where outside technical assistance does not add to the sum total of knowledge available in the country: its use is that it is a form of double checking and is prestigious because the advice is from outside. There is now a wide debate on this project and there is a strong current of opinion in favour of phasing the project and starting with linking the Southern rivers—the Godaveri, Krishna, the Pennar and the Kerala rivers. A start can be made in the Krishna-Pennar link, the Parimbagalam-Aliyar link etc. In particular the last is but one example of the hydrological potential in diverting into the Cauvery at an economic cost some of Kerala's rivers flowing wastefully into the Arabian sea. Against this background, it is depressing to read the report on the recent Kerala-Tamil Nadu River Waters Committee on the Suruvani Reservoir and the Pandian-Punnapuzha and the Chalipuzha-Choladpuzha hydro electric schemes. On neither co-operative project has any headway been made. Today what is holding back the economical and effective use of our water resources is not finance, not engineering skill but lack of inter-State agreement. If matters continue along these lines, there will be a strong case for making all inter-State river projects a central responsibility. An alternative is for a National Water Board and under it Boards for the major rivers in the States to regulate policy and decide on disputes. (See Vol. I No. 6 and Vol. II No. 1.)

Fair Price Shop : The price situation referred to in the last issue of the Bulletin (Vol. II No. 2) has led to the call at the Central level for the opening of fair price shops in the States to correct the defective distribution system. This is also the position in Tamil Nadu—where the price rises have no relation to the satisfactory supply position. In fact, a separate department in the Civil Supplies Unit has been set up in the State to build up buffer stocks and adequate quantities of food grains and other commodities. The separate organisation in the Food Department will arrange regularly for the supply of essential articles to consumers at fair prices.

Sathu Mavu: Parallel to the international nutrition programme, the Gandhigram Institute in the State has devised a low cost infant weaning food at 10 paise per day per child in the Athoor block of Madurai District. In that district the child which is breast fed upto three years is one third deficient in calories and one third of the children are mentally defective. 23 locally available protein rich foods which are easily assembled, and normally locally associated with health and strength have been developed, into this food. It is called Sathu Mavu and made up of Cambu flour, green gram, dhal flour, groundnut flour and jaggery with a 22-24 gram protein content and 350-445 calorie value. It is now necessary to generalise this programme throughout the State—as a priority for the remaining years of the Fourth Plan and in the Fifth Plan.

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Agricultural Progress:

Rice: The Samba paddy crop in Thanjavur is in and the Samba and Thaladi crops are well above last year's yield in North Arcot, South Arcot, Chingleput and Thanjavur. From Thanjavur district, the Samba and Thaladi crop will amount to 11 lakhs tonnes, with a 50 percent marketable surplus. At the end of January, the price of Thanjavur rice had fallen by about Rs. 4 to Rs. 30 per 577 kg. bag. To hold the price line for the farmer (which is the opposite of the rise faced by the consumer), the State Government has fixed a tentative procurement target of 1.25 lakhs tonnes of rice in the four districts, North Arcot (20,000 tonnes), Chingleput (15,000 tonnes) South Arcot (30,000 tonnes) and Thanjavur (60,000 tonnes). The Food Corporation of India is operating in Thanjavur and Chidambaram areas procuring roughly 30,000 tonnes for its four mills. 15,000 tonnes of this are open market purchases by the FCI in February and March. In other districts the Government has appointed 30 hulling agents and wholesalers to receive levy paddy during the current season. There are sanctions attached to purchasing at a lower than the prescribed price or refusing to accept stocks. This satisfactory rice production situation in the State is part of the good rice performance in the country which proceeded from an import of 7.8 lakh tonnes in 1965 and 2 lakh tonnes in 1970, to reach self sufficiency in 1972. The 1970-71 production of 42.45 lakh tonnes will have to hit the 52 lakh tonnes target by the end of the Fourth Plan. This means that for Tamil Nadu a continuously increasing effort, so that the increase in rice production in the next two years is around 50 percent higher. This the State can achieve if (a) the varietal nature of the production is continued : it is not one variety but a multitude, ADT-27, TKM-6, CO-25, GEB 13-25, IR 8, IR-22, Bala, Cauvery etc., each suited to a particular soil and climatic condition that is needed (b) rice farming is extended to dry areas through a package cultivation practices covering the new varieties Kanchi, Cauvery etc., which can be grown in areas with an annual rainfall of 75 cms; (c) the timely availabilities of all the needed inputs, fertilisers, pesticides, water etc., (d) marketing and post harvest facilities to which reference is made later and (e) continuing co-operation between the Tamil Nadu Agricultural University, the Department of Agriculture and the farmers in the State—including market research into the pattern of consumer preference which is decisive in the case of rice demand and consumption. In this connection the new rice harvester combine developed in the State threshes, winnows, grades and bags clean grain in one operation at the rate of one acre per hour. Its low centre of gravity enables its use in hilly and uneven areas. This simple tool should now be generalised to ensure the fifty percent increase in growth rate that is our aim for the next two years.

Pulses : The State's serious deficit in pulses production has been analysed in previous issues of the Bulletin (Vol. I Nos. 5, 8, 9). Now a dry pulses research station is to be developed on a 90 acre site in the Vemban forest in Pudukottai taluk of the Tiruchirapalli district. It will work on new short duration yielding pulses for dry farms in the State. The Aduthurai Research Station will undertake similar research on wetland pulses, black and green gram. Seed production will involve : (a) increasing breeders' seeds in a 40 acre seed farm in Vemban (b) developing foundation seed in a 900 acre tract also in Vemban and (c) producing secondary seeds in the farm lands with the help of foundation seed. About 15 percent of the 41 lakh acres under pulses will be provided with the new seeds to start with. This dry land research station and seed farm for pulses will cost around Rs. 2 crores and, under existing Centre-State financial relations, awaits Centre approval. It is a programme which must be immediately executed.

Cotton : The end January agreement with Sudan to import 3.20 lakh bales of cotton at a cost of Rs. 32 crores is a third of the total annual cotton imports of the country. In 1971-72 over eight lakh bales of cotton are being imported. With the cut in aid and the need to economise on imports, cotton is one item in which there should be rapid and complete import substitution. In the last three issues of the Bulletin (Vol.I No. 11, Vol.II Nos. 1 & 2), the development of Karunganiri-8 at the Kovilpatti station and its cultivation in the State's dry lands have been highlighted. The textile mills in the State consume about 1/9 of imported cotton - 42,000 bales of the long staple (1-3/16) variety at an annual cost of Rs. 10 crores. By 1974 Tamil Nadu consumption of this long staple cotton, presently imported from Sudan and the UAR, will increase by 30% to 56,000 bales. The successful work done in the IARI regional station, Coimbatore in developing the extra long staple variety—Suvin,—1.5 inches, 100s to 120s spinning counts and blendable with synthetic fibres—were referred to in the 1971 June and October issues of the Bulletin (Vol.I Nos. 5 and 9). The station has also further improved the long staple MCU-5 (referred to in Vol.I No 5) in helping it to resist Verticillium wilt and in developing its glandless cotton seed with its important extra textile uses as a source of edible oil and protein for mass consumption—an important means of combating our protein hunger. The station has also developed another short duration cotton variety of 125 to 130 day duration, PRS-72/PRS-74, which can be multiple cropped. It can be grown off season in our paddy fallows in the State. And so the stage is set for the State production of wet and dry cotton—using Suvin, PRS-72, MUC-5 and its improved strains and Karunganni-8, each adapted to differing soil and climatic conditions of the State and to the market offered for each variety by the mills in the State, — and to the stopping of cotton imports by 1974.

Oil Seeds : There is a crisis like situation developing in the State and Country in the matter of oil seeds production and processing. As against a world per capita average consumption of 18 kgs. of oil and fats, our per capita consumption which was 4 kgs. in the sixties has now fallen to 2.6 kgs, while the requirements are mounting by over 33 percent in the next five years from 33.39 lakh tonnes today to 44.52 lakh tonnes in 1975. The State's production of oil seeds must be reoriented to meet this crisis situation—as referred to in Vol. I Nos. 9 and 11 of the Bulletin. An immediate expansion of production is possible as can be seen in our groundnut production which contributes 60 percent of edible oil but yields only 770 kgs. per hectare as against 2190 in Nigeria. Our linseeds yield 200 kgs. per hectare as against 900 kgs. in Mexico. First there must be an increase in irrigated and dry oil seed farming in the State as suggested in the Vol. I No. 9 issue.

The State programme to increase groundnut farms and sunflower farms by over two lakh acres is now starting with 80,000 acres. Second the inputs of the packaged programme for this increasing yield are crucial. TMV-7 and Pol-7 along with mixed wood ash and cattle manure is raising groundnut yields. But the most hopeful means of increasing both oil seeds production and edible oil supplies is through the expansion of what are called minor oil seeds. In this State much minor oil seeds are sun flower, safflower, castor and soyabeans. Soyabeans has not caught on in the State and has the problem of protein processing before oil extraction. The Kovilpatti regional research centre has developed the sun flower variety K-1, as reported in Vol. I. No. 9. Now this variety is being raised in 80,000 acres in the black soil areas of Tirunelveli and Ramanathapuram districts. Through this programme an additional production of one lakh tonnes of sun flower seeds will be available in the State. The dry land farmer growing K-1 earns Rs. 200 per acre. Under irrigation its return is Rs. 800/- per acre. Further hybridisation of this variety is under way to increase yield by 30 percent and oil content by a larger margin. Safflower, castor, glandless cotton seed (referred to earlier) are also part of the minor oil seeds development which serve a dual purpose as raw material for edible oils and for industrial uses such as paints, soaps, detergents. The State's production of non-edible oils, Vembu and Iluppai can also be used in industry and so increase the edible quantum.

Other Pointers: The development of the familiar State dry crop-cluster beans—not only as a vegetable for human and animal consumption but as an important industrial raw material has industrial and export implications, for this State product. The gum produced by this plant is used in the paper, textile and mining industries and in various food products. The latest variety FS. 227 which is short duration, drought resistant, can be grown in our dry areas in Ramanathapuram, Dharmapuri and Tirunelveli where other crops are not grown. Another crop which needs attention because of its export market is tobacco which witnessed a 20 percent increase in 1971 compared to 1970. The new bacterial pesticide—Baceillus Popillae—deals effectively with the tobacco bud worm and should be applied as part of the State's aerial spraying programme or with conventional ground equipment. The technology developed at the Regional Research Laboratory, Hyderabad to convert farm wastes, rice husk, bagasse and coconut shell into active carbon for decolourisation and purification is of direct relevance to this State with its large mass of rice husk and coconut shells with its farms and mills. A small scale industrial plant using the new technology should be developed in the State.

Marketing: With the war and Bangla Desh demands for rice and wheat, there has been the trend to rising consumer prices, while the bumper harvest of 107 million tonnes last year and 112 million tonnes this year of food grains led to the lower purchase prices offered to the farmer. It is at this point, as noted earlier, that the Food Corporation of India and its agencies acting on behalf of the State introduce a measure of stability in the prices offered to the farmer. It is by releases from the buffer stocks to the fair price shops that speculative consumer price rises are being arrested. The continuing rise in sugar prices is an important indicator that the FCI and the Department of Civil Supplies in the State have a normal and continuing role to play in building up buffer stocks to provide a price floor for the producer and to release supplies to prevent price rises for the consumer. That is the normal function of the civil supplies agencies and it is because it was not done with sugar last year, that we face the current mess. Another area of marketing which needs rationalisation and strengthening is co-operative marketing.

Against the National Agricultural co-operative Marketing Society's plans to establish 130 regional pilot centres and the Rs. 1.5 crores State programme to develop a marketing net work in the Cauvery delta analysed in the January 1972 issue of the Bulletin, (Vol. II No. I) the actual functioning of these societies shows that out of 730 societies in the South, 332 did no marketing business and 136 were doing less than Rs. 1 lakh business every year. Further in so far as they engaged in marketing they concentrated on paddy and sugarcane to the exclusion of other crops. A reorientation of this important agricultural service involves: (a) servicing the small farmer by collecting, processing and marketing his crop; (b) linking credit to the small farmer with marketing (only Rs. 75 crores were recovered through marketing out of the Rs. 542 crores loans in 1969 70); and (c) providing the service for all crops produced by small farmer and not only the two presently serviced.

Land Legislation: Under the Tamil Nadu occupants of Kudiyiruppu Act which is being enforced in Thanjavur district, about a lakh of agricultural labourers will be granted ownership of the sites on which they have built their homes. Under the Land Ceiling Act, the Government has stated that it intends to enforce the 15 acre ceiling in face of the many and varied benami transactions (see Vol. II No. 1) and to extend the ceiling legislation to sugarcane lands and grazing fields. A further legislation has just been adopted early in February by the legislature – the Madras City Tenants' Protection (Amendment) Bill 1972—under which the tenant is protected from eviction in respect of the super structures that he has put up on lands that he has taken on lease. This legal protection now overrides anything to the contrary in the terms of his contract The State is moving slowly in the direction of developing Tamil Nadu farming unto a land of small farming. The next important problem is to deal with the absentee owner. And the pace of the movement itself needs speeding.

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Industrial Pointers :

Salem Steel: The steel prospects of working to 80 percent capacity outlined in the January issue (Vol. II No. 1) still remain only a hope. 1971-72 production is likely to remain at the 1970-71 output of 6.1 million tonnes (in 1969-70 it was 6.4 million tonnes). For 1972-73 a target of 7.2 million tonnes has been set and to attain it, a new holding company is being established to administer and coordinate the entire range of the iron and steel industry in the public sector. The existing steel plants and the new ones being set up, the Bharat Coke, Asian refractories and units dealing with manganese and iron ore—all will be subsidiaries of the company. Salem which now becomes a subsidiary is moving forward slowly. The project area has been finalised and land acquisition is under way. The techno economic feasibility report envisages an output of 240,000 tonnes of finished steel and a total project investment of Rs. 285 crores.

The plant is expected to begin functioning in 1979. Every effort should be made to reduce this seven years delay through speeding up the preparation of the detailed engineering report and commissioning now the different parts and machinery of the plant. Our experience with Salem steel is illuminating with regard to the holding company which is a good idea. All coordinating and policymaking instruments are good provided there is something to coordinate and something to set policy about. (The Minister of

Science of Israel once remarked to me: "please do not ask me to set up a Science policy organ until I have some science on which I can have a policy"). In any case Salem steel shows that it is not coordination and overall policy which are our bottlenecks but our administrative procedures, our planning procedures, our problems of productivity—the kind of day to day problems on which a holding company is of little use.

Tuticorin Fertilizer : The Fertilizer industry must expand its production as in today's situation fertilizer imports are a luxury and must be discontinued almost immediately. An additional production of 2-3 lakh tonnes would save Rs. 25-40 crores in foreign exchange. There is the problem of producing to capacity. Against a capacity of 13.4 lakh tonnes, 1970-71 production was only 8.3 lakh tonnes. Second there is need to expand capacity. The plans to produce indigenous equipment for both purposes together with ensuring a fertilisers distributive net work for the small farmer will help attain the production and distribution target. Against this background in April 1974, the giant Rs. 71.10 crores joint sector Tuticorin Fertiliser project in which the State Government (Rs. 5 crores) the promoters (Rs. 4.89 crores), IDBI (Rs. 10.25 crores), IFC (Rs. 2 crores), ICIC (Rs. 1.75 crores), LIC (Rs. 2.5 crores) Unit Trust (Rs. 1.5 crores), Atomic Research (Rs. 3 crores), Commercial Banks (Rs. 26.50 crores), Capital issue (Rs. 19 crores) are involved, will commence operations. The foreign exchange costs of the project are shared between the United Kingdom (£ 7.74 million) and Japan ($ 20.3 million). The project which was described in earlier issues (Vol.I Nos. 4 and 8) has the following revised annual production schedule: 3,52,000 tonnes of ammonia, 5,12,000 tonnes of urea, 28,000 tonnes of diammonium phosphate, 128,000 tonnes of complex fertilisers, 150,000 tonnes of sulphuric acid and 52,8000 tonnes of phosphoric acid. The project is both capital and labour intensive, will employ some of our best engineering and management talent and provide for workers participation at the plant and shop and floor level. Market surveys show that when the project goes into operation, the fertiliser demand would be 12 lakh tonnes. With Tuticorin, the total supply will only be 10 lakh tonnes. It may be wise to phase the multi phased operation of this giant complex so that management and interlocking may be effective.

A Second Atomic Station : One feature of this Southern Petro-chemical Industries (SPIC) project is its integration with the Heavy Water project of the Department of Atomic Energy. The Tuticorin plant will produce 72 tonnes of heavy water per year to be used as moderator for the Kalpakkam and other nuclear power stations in the country. With the expressed inability of Mysore State to meet even our current deficit of 150 million kwh. of power, the power deficit situation in the State analysed in the January issue (Vol. II No. 1) becomes serious. Mysore is currently supplying Tamil Nadu 200 million kwh. and similar requests are being made to it by Andhra, Maharashtra and Gujerat, of which the Gujerat crisis demand has had to be met. Further it has its own expanding power demands to meet, apart from short term shortages caused by the low level of the Lingana Makki Reservoir on which the Sharavatti Hydro-electric project depends. Against this background, the State's decision to locate a second atomic power station in Madurai district and its request to the Union government to approve the project take on urgency. This is in addition to the thermal plant at Tuticorin and the second mine cut requested at Neyveli.

Railway and Harbour : The Trivandrum-Kanyakumari Broad Gauge link is now a reality (see Vol.I No. 11). The 142 km. connection is between Tirunelveli and Trivandrum with a branch line, from Nagercoil to Kanyakumari. The whole project will cost Rs. 14.5 crores.

It will carry 7 million passengers and 7,50,000 tonnes annually. More than three fourths of the goods traffic will be in the key items of mineral sand, ilmenite, cement, salt, fertilisers and grains amounting to 5,20,000 tonnes. This long delayed investment will thus more than pay off. The other expansion which will also be completed by mid 1974 is that of the Madras harbour which when complete will take in tankers of 1,00,000 tonnes and handle iron ore freighters. Vol.I No. 8 of the Bulletin called attention to the planning and execution lags, in the project which have been corrected in part. By September of this year. the tanker berthing facilities will be ready. Madras now receives 40,000 tonnes tankers which discharge about two million tonnes of crude. From the last quarter of this year, it can double its intake of crude. It is the other part of the harbour expansion and—for the State and Country—the more important part which is taking time. This is the iron ore berth and the iron ore handling equipment. Iron ore is a major export item from the Madras port and the completion of this extension is therefore vital. Further delays will also mean increase in the total cost of extention.

Madras Refineries and Crude Prices: After three price increase of Crude, within a year, November 1970, February 1971, and June 1971, the January 1972 demand was to increase the June price of $1.66 and $1.69 per barrel for Esso, Burmah-Shell and Caltex to $1.70 and $1.73. The government faced with a choice between increasing the import bill for Crude by Rs. 40 crores per annum for the same quantum or reducing the quantum by 16 per cent and maintaining the import bill at the pre-increased price level, has rightly chosen the latter course. The companies have been told that their foreign exchange allocation will not be increased. And so as they are importing at the higher price, there is now a 10 percent reduction in Crude imports, 10 percent excess of crude refinery capacity, 10 percent reduction of petroleum products. The Madras Refineries is in a curious position. In its annual balance sheet published in February, it shows a net profit of Rs. 102.50 lakhs but only because its computation is based on the price of $1.35 per barrel. Actually the Madras Refineries is supplied Darius Crude by special agreement with the National Iranian Oil Company at the rate of $1.91 a barrel (which is higher than the most recent price hike by the three companies). Negotiations are under way between the two governments to reduce the price of Darius Crude below the 10 cent reduction offered by Iran. Whatever final price is agreed upon, it will certainly be some 30 cents more than the MRL computation, so that the apparent Rs. 102.50 lakhs profit is likely to be turned to a cumulative loss of Rs. 68 lakhs, when the real price of crude is taken into account, as the chairman himself points out. All our coast based refineries like MRL are going to be seriously affected: And this situation calls for: (a) an increase in internal production of Crude; (b) use of electricity and even more coal in our industrial undertakings; (c) savings in the domestic use of Crude and petroleum products. There will also have to be a restructuring of our refineries which for some time will have excess capacity. As in the case of MRL, asphalt production, domestic gas and kerosene production should be the major lines of concentration by the refineries. From all angles the performance of the Madras Refineries has been satisfactory.

Textile Mills: The Tamil Nadu Textile Corporation (TNTC) in accordance with the government decision to reopen all viable units, will be taking over four more textile mills out of the remaining five: Kaleeswarar, Somasundara, Coimbatore Spinning and Weaving, Pankaja and Balaramavarma Textiles. Agreement has been reached between TNTC and the National Textile Corporation (NTC) on this take over as well as on the

quantum of assistance from NTC for the five mills already taken over. Four of these five mills (Coimbatore Murugan was taken over only six months ago) are working to 90 percent capacity; they are breaking even and providing for past liabilities; workers' D. A., are being paid at the full rate; a Rs. 2.78 crores modernisation programme is under way over a three year period. In the first phase Rs. 40 lakhs have been spent on improving the spring frames and the whole modernisation programme will be using indigenous machinery. The mills have switched over to spinning higher counts which have been welcomed by the Maharashtra and Gujarat power looms. Some mills are planning to spin staple fibre for which the State government has turned over 18 tonnes of viscose fibre.

Sugar: The forecast in the last issue of the Bulletin (Vol. II No. 2) that the 1972–73 sugar needs would be around 48–50 lakh tonnes is now confirmed after further analysis of the production and demand trends of the October-December 1971 period. During that period, the offtake from sugar factories was 10.54 lakh tonnes (in October-December, 1970 it was 9.90 lakh tonnes), production was 8.66 lakh tonnes (in October-December 1970 it was 9.56 lakh tonnes) so that at December 31, 1971 sugar stocks stood at 11.83 lakh tonnes (against 19.37 lakh tonnes in December 1970). The production and stock position is extremely serious. Present indications are that the January-April 1972 production will be 24 lakh tonnes, which means that the year's total will be around 33 lakh tonnes (and not 36 lakh tonnes as predicted in the last issue) against a consumption trend of 40 lakh tonnes for the year. The stocks in April 1972 will therefore be around 22 lakh tonnes as against 32 lakh tonnes in April, 1971. The action to increase production now calls for a long term policy covering (a) cane prices: (the Chingleput Sugarcane growers' Association request a price of Rs. 85 per ton of sugarcane supplied and refund of transport charges to the growers for bringing the cane to the factory); it is clear that a uniform price for all States with different climatic, soil and growing conditions will act as a production deterent; (b) sugar prices: this involves not only an agreed sale price but rationalisation of the excise levy, the cess and purchase tax which are unique to this State and the incidence of the export commitment particularly in view of the 5 percent production increase in the mills in this State that is expected; (c) Distribution channels; here speedy movement of supplies to the fair price shops and the rational functioning of the open market needs to be ensured. And this calls for co-operative action by the Union and State Governments, the cane growers, the mills and the trading agents.

Leather: Hides and skins which constitute the State's major export has been this year facing a weak export demand especially on the skins side, due to the higher prices being quoted by sellers. Buyers in Europe and U.K. who are the major market are withholding orders at today's prices from Madras which are regarded by them as staggeringly high. This trend is already passing with the lowering of prices but the underlying causes for this weakening highlight the need for expanding and strengthening our processing activities. From this point of view the establishment of a development-cum-demonstration centre for finished goods at the Central Leather Research Institute will be a major source of help in expanding the export of finished leather goods. From the current Rs. 1.6 crores, this trade should expand to Rs. 10 crores by the end of the Fourth Plan. The Centre will be of particular help to the small tanner by designing for him simple machines and modern methods for manufacturing finished leather goods. It will also be a contribution to rural employment in developing this cottage industry. Another

important development is the invention in the Institute of a device called the trickling filter, which converts wasteful effluents from tanneries which foul the atmosphere with obnoxious odour, into useful food for plants. This would be a major remedy to the pollution of the atmosphere by the effluents flowing out of tanneries which is becoming serious. The trickling filter will break down the impurities in the effluents into substances which are assimilable as protein foods for plants and also eliminate their offensive odour. The cost of a trickling filter is Rs. 20,000/-. Its use should be made compulsory for all large tanneries and for groups of small ones.

Small Industries: The State government has once more declared its policy of special help to small industries as part of its policy of industrial dispersal. Newly started industries in the backward taluks of Ramanathapuram, Sivagangai, Mudukulathur, Paramakudi, Tiruvadanai, Melur, Thirumayam, Kulathur and Alangudi are eligible for a subsidy of 10 percent of their capital cost of investments of Rs. 50 lakhs and less. Further government purchases from small scale units will get a price preference of 10 percent and for units in government industrial estates the price preference will be 15 percent. Probably the most important spur to small industries in the State is the assurance of continuing supply of raw materials and essential items to them through the Tamil Nadu Industrial Development Corporation and the Small Industries Development Corporation. This policy together with the institutional finance from the State and financing agencies to those starting small industries should be a sizable contribution to the State's industrialisation and employment programme.

The joint sector project being sponsored by the Tamil Nadu Industrial Development Corporation to produce in collaboration with Dunlop 3 lakhs of automobile tyres and 3 lakhs of tubes per annum, though granted a letter of intent over a year ago in December 1970, is still under study by the Union government because of the foreign exchange component. Given the market conditions, present and future, for tyres, this project should be put into operation speedily. Another project which has been given a letter of intent is a Salem proposal to set up a factory to produce 10,000 motor cars per annum with indigenous parts, mostly manufactured in the small scale sector. The real attraction of the project is that it has a pistonless engine which will solve the crying problem of air pollution through exhaust gases. With the opening at the end of January of the Rs. 30 lakh new unit in Royapuram, the roller flour mill capacity in the State goes up by 60,000 metric tonnes. Its modern machinery includes the pneumatic suction device and a 1,000 tonne silo along side the plant which will bridge the gap between 38,000 tonnes of alloted wheat and 30,000 tonnes capacity of the State's roller mills. Here again the licensing procedures have caused an unnecessary delay for another needed and State government sponsored project. The procedures need rationalisation and stream lining.

Annual Reports: Voltas reorganisation should ensure capacity utilisation with indigenous raw materials and components. Except the mining and allied equipment division, in all other lines, capacity is being expanded and the share market is being tapped to finance those expansions. The engineering industries generally are using similar techniques to increase their output of industrial machinery, tractors, diesel engines, machine tools etc. Carborundum's report shows similar production despite the labour trouble it faced at Edapally and higher raw materials costs. The record of increased production of bonded abrasives and super refractories should help the government to approve its request for expanding its capacity for manufacturing bonded abrasives—

preferably in this State. Similar expansions should be approved for production of electro-cast and fused cast refractories. which are at present imported. Ashok Leyland's annual report also records steady progress despite labour troubles and rising costs. Forward orders, both internal and export, are at an all time record. Its expansion programme which is impressive should, however be supported by an adequate research and development effort.

Industrial Relations: Industrial relations in the State worsened during January, with labour strikes and lockouts in the Simpson group, Buckingham and Carnatic, Heavy Vehicles Factory, a one day lightening strike covering 40 units including MRF, Ashok Leyland, KCP, EID-Parry etc., and a threat of labour unrest in the Coimbatore textile complex. The serious effect on the State's industrial performance particularly at this time of national emergency has led to various decisions by the government and union leaders to settle the immediate causes for the unrest. One widely discussed long term proposal is for legislation to ensure that labour leaders and elected officials are from within labour ranks. Further regular tripartite consultations are continuing between government, labour and management at the national level to ensure industrial peace and maximum production during the emergency and to establish machinery that can supervise a three year moratorium on strikes and lockouts. The suggested machinery now under study is a joint tripartite committee for each industry. On the tripartite committee, all unions will be equally represented. That committee will decide on regional and plant committees and their composition. One feature that is disturbing in the present evolution is that the dialogue on industrial relations both in the State and at the Centre is taking place between the government and the labour unions, with the employer who is the other key figure remaining silent or out of the picture.

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Education and Science:

Task force of Planning Commission: The State debate on a thorough going reform of education in Tamil Nadu reported in the last two issues (Vol. II Nos. 1 and 2) continues. The Task force on Education, Science and Technology of the State Planning Commission has addressed a consultation memorandum on educational reform in Tamil Nadu, not only to the four departments of government—Finance, Agriculture, Health and Education, the Vice-Chancellors of the five Universities in the State—Madras, Madurai, Annamalai, Coimbatore and Guindy—the six teachers unions, but also to the 200 student unions of the 200 colleges in Tamil Nadu. The suggestions for reform that have come in and that will be published by the State Planning Commission show an impressive consensus on the major lines of reform. In addition, studies are under way on (a) retention and drop outs in rural and urban institutions—school, college and polytechniques—, (b) the economic class profile of the student who goes through school on to college—(the Minister for Harijan Welfare stated at the end of January that (i) with all the coaching at the special Institute in Madras, scheduled caste candidates failed in their viva voce at UPSC exams and (ii) the 18 percent employment quota reserved for scheduled castes remained unfilled because there were not enough educated SC students. Are students who survive through college from the upper and middle classes and are drop outs the children of the poor majority? and (c) the effectiveness and economy of out-of-school education and training programmes—how much do they cost? why have they no drop outs? why are their graduates all employed and never face unemployment?

Discussions on Education Reform: In school education, the Tamil Nadu Asiriar Kazhagam recommends that the present 11 year school curriculum should be completed in 10 years and the ten year school system should have a more highly trained teaching staff. The State government has announced a compulsory medical check up programme for 5000 school children in Madras. Its estimate that a State wide programme would cost Rs. 4 crore could be considerably reduced if the teacher can maintain the student's health record, observe his health, record height and weight and test vision and hearing. Medical examinations and curative measures should be over and above this and the whole scheme would then cost less. A monitoring of the school nutrition programme, particularly of the school garden and fisheries schemes, is also proposed. From outside the State, the Central Board of Secondary Education has decided to introduce job-oriented subjects in high schools—secretarial practice, catering technology, medical laboratory technique, optometry and physio-therapy. Other reforms include a reconstructed syllabus in physics, chemistry and biology with more emphasis on practicals and the introduction of sociology and physical education as electives. The Delhi University Agricultural Research Centre in a study on school drop outs and retention makes three suggestions. First that there should be no uniform school hours for the country or for the State or may be even for a district. At present school hours and particularly examinations are held at the peak periods of agricultural activity. Even a small child may have work to do on the family farm or may be able to find employment on a daily basis during the peak period or may be called upon to work with parents during peak periods as a substitute for adult labour which will then be diverted to other types of work. The opportunity cost of keeping a child in school is therefore higher during harvesting and sowing seasons than during the rest of the year. So the first suggestion is that rural school vacations should coincide with peak periods of agricultural activity in each locality and organised school activity and examinations during the slack period. For this the timing of school activities should be decentralised and left to each rural area. Second it is proposed that there should be shorter school hours. For this research should be undertaken in formulating a school curriculum for shorter hours and allow for its variation over the year in accordance with the intensity of agricultural activity. Rajasthan has successfully introduced a three hour school programme, which has been welcomed and commended by the parents. Third the seasonal dropout in school attendance is high among Harijan and landless labourers' children. Our system of school financing induces over reporting of school attendance (compare the education ministry's figure of 48 million children attending school in 1961 and the Census figure of 41 million). Hence the third suggestion is that the provision of midday meal to school children is a higher priority than free books, stationery etc.

College Education : As far as college education is concerned, the State Governor proposed at Madurai an intellectually oriented education, whereas the Chief Minister stressed the need to link education directly to employment prospects. The Education Minister on the same occasion proposed a basic reform in the examination system to make it an assessment of knowledge and not memory. The Vice-Chancellor of the Madras University reports that the University is examining a 2+2+2 or 2+3+2 higher education programme. There is wide spread endorsement in the correspondence columns of the newspapers for the two year intermediate degree which will represent a higher level of skill than the SSLC or the present PUC followed by a two year degree and optional three year honours course. The fall of University standards is also being debated, the latest analysis pointing to the absence of regular change and updating of syllabi and competent staff.

An industry oriented engineering drawing course will be indroduced in the first year mechanical engineering class in all our polytechniques from July of this year. It aims at maximum student activity and the topics are related to industrial practice and applications. From outside the State, two important developments should be noted. The Kerala government faced with a back log of 10,000 unemployed teachers plus 2,000 who will graduate this year plus 4,000 supernumeraries, has decided to close down its 104 teacher training institutions till 1974-75 and use the teachers of these institutions for in service training of teachers. Tamil Nadu also may soon face this problem. The other develoment is that the Union Minister of Education in a statement at Mysore describing the present collegiate education as "driving an increasing number of aspirants into a purposeless pursuit of robot like routine, ending with the award of a degree" recommended a restructuring of education, involving vocationalisation of secondary education and dropping the requirement of a university degree for a job. He also made the important suggestion of relieving the Universities for responsibilities of collegiate education, so that Universities could be centres of reflection and research.

Functional Literacy: In early February, the Population Council of India organised in Hyderabad a fornight's workshop on Functional Literacy and Family Life Planning Education for the Southern States of Tamil Nadu, Andhra Pradesh, Mysore, Kerala and Pondicherry. The problem before the workshop was well known. In the five Southern States illiteracy ranges from 75 percent in Andhra Pradesh to 38 percent in Kerala. How is this massive flood to be stopped and reversed? What is functional literacy? It is not the three Rs. — It is education in greater productivity, improved health and the values of truth and tolerance. What is family life planning education? It is to plan one's family to attain the above three objectives--increasing income, health and values and for this to aim at a small family. The workshop recognised that there is no all India solution to this problem, which is peculiar and particular to each locality and it proposed methods of developing teaching materials and aids for this programme objective suited to each local area.

Science Plan : The National Council of Science and Technology in response to its mandate and to the national emergency and the policy of self reliance, is at work with over 1000 scientists and technologists, divided unto 21 groups of 10 to 12 experts each, drawing up a national plan for science and technology covering national resources, fuel and power, heavy engineering, on to aeronautics, electronics, consumer industries, marine resources, use of new materials and foreign collaboration in research. Parallely the Council of Scientific and Industrial Research and the National Laboratories are being reorganised in the direction of decentralization and increase consultancy services to industry. The national plan of science and technology should have the help of the directors of the major research bodies,—CSIR, ICAR, ICMR, DAE. Their current exclusion makes no sense because they are the ones who know the magnitudes involved and who will be responsible for executing the plan anyway. No executor who has not been in on the planning stage can be intelligent in execution.

Air Pollution : Further work on air pollution in the City and the Country was carried forward at the January Symposium at the Engineering College, Guindy, attended by over 100 scientists who identified the sources of pollution as diesel vehicles, steam locomotives and domestic coal stoves. Madras, particularly the Basinbridge area has

high suspended carbon monoxide levels as high as London or New York. That is because though our car population is one quarter that of theirs, our exhausts discharge four times the carbon monoxide of European or American cars. The need for setting up monitoring stations at all industrial locations and in Madras to measure pollution is now generally accepted.

Science Research: Carrying forward the work on the gene by Dr. Khorana, the Indian born Nobel laureate in the U.S., research scientists at the Indian Institute of Science are working on a five year programme to find out the functions of genes by synthesis. Further to the report on computer programming in the last issue of the Bulletin (Vol. II No 2) the January seminar on information retrieval in chemistry in Madras referred to the traditional tasks of cataloguing, acquisition and circulation and urged the use of mechanical and electronic aids in the recording and indexing of the fast increasing and exploding scientific literature. At the world level to ensure international co-operation in this task, Unesco has launched the World Science Information System called UNISIST.

Among the sixty awards to innovation in technology development and import substitution, Mr. Josef Noyedley of Messers Praga Industries, Coimbatore, won an award for developing bullet proof light weight helmet for the armed forces, Dr. Nayudamma, Mr. Mukherjee and Mr. Sarkar of CLRI, Madras for developing a process on the manufacture of synthetic tanning agent for white tanning and a second award to Dr. Nayudamma for development of a "Bandhani leathess".

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Employment:

Cabinet and Secretariat Plan: The unemployment situation is worsening and demanding increasing attention. The January comprehensive note of the Cabinet Secretariat is one such. It calls attention to the fact that 170 million children born between 1955 to 1965 will turn 15 years and 90 million students of these will join in the labour force in the seventies plus another 1.7 million students (born between 1947-1955) at present undergoing tertiary education. As against this only 27 million workers will retire and die during the decade. The net increase in the labour force in the seventies will be over 60 million. In 1961 over one million matriculates and above were unemployed out of 8.2 million. Today there are 14 million such, with only 9.4 million in the labour force and the unemployed is about 1.5 million. In June 1970, 61,000 engineers were looking for jobs through the Employment Exchanges. And so the note proposes expanding employment in the distributive trades, transport, storage, flour mills, laundries etc. So too are prospects in communications, transport and markets on which development depends. In many of these areas, educated persons can be employed as also in extending primary education, intensifying programmes of functional literacy and adult education. The note again calls for reorienting the sectoral allocations in the Fourth Plan to make them employment oriented, particularly in developing small farming, cash crops, family planning and building infra-structural facilities in small towns.

Other Plans: Yet another Plan to employ the 60,000 unemployed engineers and 20,000 unemployed scientists is proposed by the Minister of Planning through (a) their

employment on natural resources surveys and follow up of the surveys; (b) their work on the national watergrid to which reference has been made earlier in order to distribute more evenly the benefits of the major rivers and (c) their work as teachers in an improved teacher pupil ratio system: President Giri adds a programme for creating a net work of small scale and ancillary units which would both be one means of generating employment and using our unemployed material and human resources, but also, as in the case of Japan, employing these small units to produce in parts, the most sophisticated good and machinery which are then assembled in the factory.

Constraints : In these various proposals there are two problems. First is the lesson to be learnt from the Rs. 50 crores crash programme for rural employment which has not succeeded. In one block in Tamil Nadu, the Panchayat Union President sees the programme as a means of rewarding his supporters and is at logger heads with the District Engineer who refuses rightly to sanction the uneconomical rates of remuneration. In other States there are leakages and diversions of the funds to other purposes. The remedy is to make this programme part of an integrated programme of rural development which is being planned for the Fifth Plan and drop its adhoc, independent nature. Also the machinery for implementation must include all elements—elected and official. The second problem for all these programmes is resources. Resources are always limited for everything in the Country but they can be created for national priorities. A good deal of our educated unemployed resources can be put to work with little additional resources. Then there are the employment generating programmes of small farmers and small industrialists which should function within the credit frame. It is the infrastructural programmes and services including those in education, science, health and nutrition which will call for additional financial resources and this the proposal for an unemployment cess on all incomes—rural and urban, corporate and public—seems both necessary and desirable.

State Employment Programme : In Tamil Nadu all the seven programmes to generate employment and reduce unemployment described in the 1971 May and June issues of the Bulletin (Vol.I Nos. 4 and 5) are continning with varying degrees of intensity. The employment schemes for unemployed medical graduates, technicians and teachers have been put into effect in the latter half of 1971 (see Vol.I No. 7). As at September, 1971 there were 2,822 unemployed engineers in the State. Some of them are being employed in the pre investment and engineering studies of the irrigation and power schemes for the Fifth Plan. 600 are being given apprenticeship training. The second beggar relief home opened in mid January at Ulundurpet and the first one opened at Paranur in October and four others planned at Bargur, Malavadi, Pudukottai and Ramanathapuram will be both a programme of rehabilitation and self employment for some 3,000 unemployed beggars. Similarly Madras city's mass cleaning compaign inaugurated from early Februrary, if followed in other urban areas, will also be employment generating, besides contributing to civic improvement.

Youth Service Corps : The first meeting of the Advisory Committee of this pioneering programme to create graduate employment and canalise youth ideals and energy in State development was held at the end of January, with the Chief Minister, the chairman of the Committee. The programme announced in the Budget speech of the Chief Minister seven months ago and described in the August issue of the Bulletin (Vol.I No. 7) is off to a

good and sound start. Out of the 2,000 corps men, 1177 men and 125 women have been trained and sent out to work in the villages and institutions. Of the 7 specialities (arts and science, education, agriculture, physical education, social work, engineering and medicine) no medical graduates have come forward for service in the corps. With 600 unemployed medical graduates in the State, does this mean that they prefer to remain unemployed and starve or sponge on their parents, rather than serve the people in the villages at Rs. 175/- per month ? Second of the programmes on which the corps men and women are working, literacy, sports and culture, environmental hygiene agriculture and veterinary activities, machine maintenance, health and work against social disabilities,—the last was particularly stressed, all other programmes should contribute to it. Third the work of the corpsmen should be placed under the BDO. Fourth the best of the corpsmen be employed in colleges to lead social/rural development programmes and be offered as Tamil Nadu's contribution to the United Nations Volunteers Service Programme. Tamil Nadu is the first State to launch this farsighted programme, using its own resources and the Chief Minister's decision to make this a continuing programme by recruiting a further 1000 corpsmen and women for the second year, 1972-73, was particularly welcomed by the Committee. Here is an employment perspective for the other States and the country to follow.

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Ethiopia's Fourth Plan: Ethiopia's Third Plan finished at the same time as India's Fourth Plan. Work is now under way preparing for its Fourth Plan. 14 Task Forces have been set up to deal comprehensively with various aspects of Ethiopian Development and Ethiopian education. The government has formed a five man International Panel—Dr. Aklilu Hable, (President of the University), Ato Agifue (Manager, Bank of Ethiopia), Dr. Weidner (U.S.A.), Lord Fulton (U.K.) and Dr. Malcolm S. Adiseshiah (India) to review the first three months work of the task forces and to assemble again in July to examine the report prepared in light of the first review. (The second article in this issue of the Bulletin is the first statement at the review made at the request of the government by Dr. Adiseshiah). This first review was characterised by three main features. First the work was being undertaken by some 100 highly competent Ethiopian educators, scientists, economists and planners wholly committed to Ethiopean development. Second the Ethiopean specialists were working at education in Ethiopea. They were concerned with integrating education with other spheres of development. Third it was a good demonstration of what Arnold Toynbee calls the new civilization which characterises the Third World, wherein a country invites foreign advisers to share in the study and analysis of the most sensitive areas of national life—which is never done in Europe or America, and which makes the developing world the bastion for peace in our world.

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Conference on Training Programmes in Research Methodology: The Indian Council of Social Science Research conference in mid January Research Methodology programmes was attended by 18 project directors and specialists. After review of the programmes in 1971/72, their achievements and failures, it was decided that the long term aim of the Council should be to institutionalise research methodology training in Universities. In cooperation with the University Grants Commission, some University centres will be assisted in providing such a programme for all Ph.D. scholars in the area. It was also decided

that the Council will publish research methodology guides and syllables. In this, the reports of the working groups on training in research methodology in each discipline when finalised will be of great help. Further, it is desirable that workshop and training programmes be planned with a sufficient time span and that thought be given now to planning next year research methodology seminars or workshop for Economics Professors who are guides of Ph.D. scholars. For 1972/73, it was decided to continue organising some 15 courses in research methodology

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Second Workshop on Economics Research Methodology :

Date and Place: The Madras Institute of Development Studies in co-operation with the Indian Council of Social Science Research will organise the Second Workshop on Economics Research Methodology for Ph. D. Economics Scholars in the Department of Economics, Andhra University, Waltair, for six weeks from Monday, May 8 to Saturday, June 17, 1972. Thanks are due to the Vice-Chancellor, Andhra University for his kind acceptance to act as host of the Workshop. The first Workshop from May 3 to June 12, 1971 was held in Madras Christian College, Madras University.

Membership: Dr. B. Sarveswara Rao, Professor and Head of the Department of Economics, Andhra University is the Director of the Workshop.

Twelve Senior Economists and Professors of Economics will be present at the Workshop each for a week to act as resource personnel.

The statistics course will be organised by the Director with the help of the statistics specilalists of the Andhra University.

35 Ph. D. Economic scholars will be selected for attending the Workshop on the recommendations of the Head of the Economics Department of the following 12 Universities in the Southern States. Andhra Pradesh: Andhra University: 4; Sri Venkateswara University College: 4; Osmania University: 4; Kerala State: Kerala University: 4; Cochin University: 1; Calicut University: 1; Mysore State: Karatak University; 4; Bangalore University: 1; University of Mysore: 3; Tamil Nadu: University of Madras: 3: Madurai University: 2; Annamalai University: 2; From outside the region: 2.

Programme: The workshop has no structured programme of lectures. It is a meeting where (the Ph.D. scholars and resource personnel) the participants, decide daily the content of the work to be done and the methods of executing it. under the general guidance of the Director, with a view to achieving the main purpose of the workshop—which is to sharpen the methodological tools of economics research and increase each participant's knowledge and ability in using the tool for his Ph.D. work. The workshop, therefore, depends on the prior preparation before the workshop and active and full involvement during the workshop of all its members in fashioning the modealities of attaining its objectives. For this purpose the workshop has at its disposal a dozen basic papers on Economics Research Methodology, the Director and two senior economists per week, one statistics course, a reference library and the capacity of its participants.

The suggested programme for each day in a six day week (Monday through Saturday) is as follows:

(a) Plenary workshop Sessions on Economics Research Methodology: 9-10.30 a.m. (Papers are available on each subject and will be circulated to participants on April 1).

1. The latest development in Economic Theory,
2. Identifying Economic Research Themes,
3. Formulation and Testing of Hypothesis,
4. Use of Statistics,
5. Use of Case Studies,
6. Use of Survey Methods,
7. Use of Census Data.
8. Use of National Sample Survey Data,
9. Use of Documentation,
10. Forecasting and Model Building,
11. Project Evaluation,
12. Structure of a Ph.D. Thesis.

(b) Statistics Course : 11 a.m.– 1 p.m. Covering Descriptive Studies, Mathematics, Probability, Statistical Inference, Correlation and Regression and Economic Statistics.

(c) Meeting of Specialised groups : 3–4.30 p.m. The participants will break into four groups to meet and discuss methodological and subject centred problems of special concern to each group. They will have the services of the resource personnel and some basic papers to help the discussion. (The papers will be circulated to the members of each group by April 1.)

1. Agricultural Economics Group
2. Monetary Economics Group
3. Development Economics Group
4. A Fourth Group to be constituted in light of the subject interests of the participants in the workshop such as Industrial Economics or Labour Economics

(d) Individual discussion and consultations : 5–6 p.m.

Regulations : The Head of Department of Economics of each of the 12 Southern Universities referred to in para 5 will recommend the participants in the workshop from the University, and forward his recommendations to Dr. B. S. Rao, Director, Second workshop, Head of the Department of Economics, Andhra University, Waltair. The Director will decide on the admission of the participants.

Participants will be in general restricted to those who have registered within a one year period from the date of the commencement of the workshop for their Economics Ph.D. degree or those Economics Research Scholars who are planning to register for their Ph D, degree to a point where they have an idea of their field of investigation. The workshop is not meant to meet the needs of Ph.D. scholars who are nearing completion of their thesis.

Heads of Departments of Economics are requested to get each recommended candidate to fill in the application forms in as much detail as possible, together with an assessment of the research potential and needs of the workshop Supervisor and the Department Heads. The Director of the workshop may negotiate with the Department Head on the application of any particular candidate.

Candidates who are applying for attending the workshop and are admitted to it must arrive in Waltair on May 7 and stay till the afternoon on June 17. Participants will not be allowed to arrive late or leave early. Those unable to stay for the entire six weeks should not apply for membership.

The workshop will provide for each participant :

(a) Second class return train fare for students and first class train or airfare return for lecturers
(b) Lodging and board (Vegetarian or non-vegetarian) at the workshop site,
(c) Rs. 2/- per day pocket expenses and
(d) Rs. 50/- for books per student.

13. The workshop will provide for Resource Personnel :

(a) First class return train fare or air travel return,
(b) Board and lodging at the workshop site,
(c) An honorarium of Rs. 200/- per work.

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February Madras Development Seminar : The February Seminar paper, Inter-State Rivers, by Haji N.A. Noor Mohammed, formerly Vice-President of the Supreme Court of the Republic of Somalia together with a summary of the discussion of the paper at the seminar chaired by Mr. M. S. Appa Rao, Publisher, appears as the main article in this issue.

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Second Article : Another article, Education and Economic Development, appears as the second article.

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INTERSTATE RIVERS IN INDIA

By

DR. HAJI N. A. NOOR MUHAMMAD

Formerly Vice-President of the Supreme Court of Somalia

I INTRODUCTION

In the context of the economic development of India, water resource development plays an important role.

1. Water Problem

The chief uses of water till recently have been domestic usage, irrigation and navigation. Due to our rapid advance in science and technology and in industrialization, water is also needed for industrial supply and hydro-electric power. There is thus greater water consumption in our country as the economic structure becomes increasingly complex. Furthermore, the population explosion has made the water problem even more complicated.

2. Interstate rivers in India

India's net work of rivers is spread over the whole country. However, most of the rivers cut across political boundaries between states and are, therefore, interstate in character.

The major rivers in India may be divided into two groups: the rivers of Northern India and the rivers of Peninsular India.

The first group consists of the Indus flowing through Kashmir, Punjab, parts of Himachal Pradesh, Haryana and Rajasthan: the Ganga and its tributaries draining Himachal Pradesh, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Bihar and West Bengal; and the Brahmaputra rising in Tibet and flowing through Assam.

The second group consists of the Narmada and the Tapti rivers running through Madhya Pradesh, Maharashtra and Gujarat; the Mahanadi flowing through Madhya Pradesh and Orissa; Godaveri running through Maharashtra, Madhya Pradesh, Orissa, Mysore and Andhra Pradesh; the Krishna draining parts of Maharashtra, Mysore and Andhra Pradesh; and Cauvery flowing through Mysore and Tamil Nadu.

3. Development of interstate river water resources and disputes relating thereto

The development of interstate river water resources was begun by the British during the colonial regime. Since independence, considerable progress has been made in the harnessing of these resources for major irrigation project[1], major power projects[2] and

1. Major irrigation projects include: Chambal Project covering Madhya Pradesh and Rajasthan Bakra-Nangal Project covering Punjab, Haryana and Rajasthan; Beas project covering Punjab Haryana and Rajasthan; Parambikulam Aliyar Project covering Tamil Nadu and Kerala, Damodar Valley Corporation covering West Bengal and Bihar.

2. Major Power Projects include: Machkund Project across Machkund river in Andhra Pradesh undertaken jointly by Andra Pradesh and Orissa; Bokara Project in Bihar across Konar river, power being shared by West Bengal and Bihar.

multipurpose river valley projects[3], which have been made possible by the cooperation of the States concerned. However, intense competition among co-riparian States for legal control and use of water from the interstate rivers has resulted in interstate disputes, which have greatly inhibited the economic development of the regions covered by these rivers.

4. Purpose of the paper

The purpose of this paper is to examine the legal framework that exists at present for the solution of interstate river water disputes and to make suggestions for improving it. The Cauvery River Water dispute is dealt with as a study case relating to the subject.

Recommendations are also made regarding the machinery to be used for developing the water resources of interstates rivers.

II EXISTING LEGAL FRAMEWORK

1. States primarily responsible for Irrigation and Power Projects

The Constitution of India provides that water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power is within the State List[4]. Under the above provision, the States are primarily responsible for the execution of irrigation and power projects.

2. Centre's power of Regulation and Development of Interstate Rivers and River Valleys

Even though water is primarily the responsibility of the States, the Constitution gives the Centre the power of regulation and development of interstate rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest[5].

For the implementation of the above provision, Parliament enacted the River Boards Act, 1956, which gives power to the Central Government to constitute, in consultation with the State Governments, River Boards for regulation and development of interstate rivers. The main function of the River Boards is to advise the State Governments on integrated development of interstate river basins. So far, no River Board has been constituted in respect of any interestate river, and the idea of setting up such Boards has been virtually given up.

3. Central Organs for assisting States :

Since some of the States do not possess the type of organization needed to plan and execute large projects, the Central Government has established the following organs to assist the States in this regard :

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3. The following are the important multi purpose river valley projects : (a) Bakra-Nangal Project in Punjab constructed across river Sutlej - a joint venture of Rajasthan and Punjab. Apart from irrigating some parts of Punjab, Rajasthan, Himachal Pradesh and Delhi, this project provides power supply for these areas ; (b) Damodar Valley Corporation in West Bengal and Bihar provides irrigation and power facilities to both States and affords flood protection also ; (c) Chambal Project in Madhya Pradesh and Rajasthan provides irrigation and power to the two States.
4. See VII Schedule List II—State List, Entry 17.
5. See VII Schedule List I—Union List, Entry 56.

(a) *The Central Board of Irrigation and Power* constituted in 1927 is responsible for the initiation of fundamental research in the country in the fields of irrigation and power and the coordination of the work of 21 research stations established in different parts of the country.

(b) *The Central Water and Power Commission* (*CW & PC*) is charged with the responsibility of initiating, coordinating and furthering, in consultation with State Governments concerned, schemes for the control, conservation and utilization of water resources throughout the country for the purpose of flood control, irrigation, navigation and hydro-electric power generation. It is also responsible for schemes of thermal power development and of transmission and utilization of electrical energy throughout the country.

(c) *A Technical Committee* constituted by the planning Commission, in which CW & PC is represented, is charged with the assessment of water resources and their utilization. The CW & PC has undertaken the assessment of surface water resources and their utilization for major and medium river-valley schemes and the coordination of the data collected by the Ministry of Food and Agriculture, Health and Transport pertaining to minor irrigation works and domestic and navigational purposes. The ultimate aim is to draw up balance sheet of water to be utilized for additional benefits in the country.

(d) *The Water and Power Development Consultancy Services* (*India*) *Ltd* (*WAPDCS*) has been set up as a public sector undertaking under the Ministry of Irrigation and Power in June 1969. WAPDCS will provide and perform engineering and related technical consultancy services for all aspects of development and water resources.

4. Machinery provided for adjudication of interstate water disputes :

The Constitution also contemplates a machinery for adjudicating disputes relating to waters of interstate rivers and river valleys. Article 262 of the Constitution provides as follows :

> "*Art. 262. Adjudication of disputes relating to waters of interstate rivers and river valleys.*
>
> 1. Parliament may, by law, provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any interstate river or river valley.
>
> 2. Notwithstanding anything in this Constitution, Parliament may by law provide that neither the Supreme Court nor any other Court shall exercise jurisdiction in respect of any dispute or complaint as is referred to in clause (1)."

Parliament has enacted the Inter-State Water Disputes Act, 1956[6], to implement the above provision. Section 3 of the Act provides that, if it appears to the Government of any State that a water dispute with the Government of another State has arisen or is likely to arise, the State Government may request the Central Government to refer the water dispute to a tribunal for adjudication. Under Section 4, if the Central Government is of the opinion that the water dispute cannot be settled by negotiations, it shall appoint a water Disputes Tribunal for the adjudication of the dispute. Originally the 1956 Act contemplated a one-man Tribunal nominated by the Chief Justice of India from

6. Amended by the Interstate Water Disputes (Amendment) Act, 1968.

among persons who are or have been judges of the Supreme Court or judges of a High Court. The 1968 (Amendment) Act has increased the Tribunal to three sitting judges of the Supreme Court or High Court. The Tribunal may appoint two or more persons as assessors to advise it in the proceedings before it. According to Section 5, the Tribunal shall investigate the matter referred to it and forward to the Central Government a report setting out the facts as found by it and giving its decision on the matters referred to it. The Central Government or the State Government can refer the matter to the Tribunal for further consideration. The decision of the Tribunal shall be final and binding on the parties. The Act confers on the Tribunal the same powers as are vested in the civil court under the Code of Civil Procedure. There is a lacuna in the Act in that it does not provide for execution of its awards.

5. Summary survey of interstate water disputes

As mentioned earlier, numerous interstate water disputes have arisen since independence such as the Krishna and Godaveri River Water dispute, the Narmada River Water dispute, Musakhand Dam Project dispute, Bajaj-Sagar Dam Project dispute, the Cauvery River Water dispute, the Tungabadra dispute, the Palar River Water dispute and the Beas Project dispute[7].

These disputes relate mainly to the following problems :

(a) sharing of waters of an interstate river or stream by the States concerned ;

(b) apportionment of construction costs and benefits of a project developed jointly by more than one State ;

(c) compensation to be paid to a State, which has been prejudicially affected by the implementation of a project by another State ;

(d) interpretation of agreements;

(e) excess withdrawal of water by a State[8].

So far only three water disputes have been referred to tribunals established under the Interstate Water Disputes Act, 1956[9].

III. CAUVERY WATER DISPUTE — A CASE STUDY

Some of the shortcomings of the existing legal framework for the settlement of interstate river water disputes have been brought to light by the Cauvery Water dispute between Mysore and Tamil Nadu.

1. Background information regarding the Cauvery Water dispute

Before recounting the shortcomings, it may be useful to provide some background information regarding the Cauvery Water dispute.

Taking its origin from the Brahmagiri in the Western Ghats in the Coorg District of the Mysore State about 18 miles to the west of Mercara, the Cauvery flows through

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7. See Dr. Jain and others, "Interstate Water Disputes in India", pp. 25-56, N.M. Tripathi Pvt. Ltd., Bombay (1971).

8. Ibid.

9. Krishna Water Disputes, the Godavari Water Disputes and the Narmada Disputes.

Mysore and Tamil Nadu and into the Bay of Bengal near Kaveripattinam in the Thanjavur District. It has many tributaries in Mysore and Tamil Nadu. The Mysore tributaries are Hamavathi, Lakshmanatirtha, Swarnavathi and Yagachi. The Tamil Nadu tributaries of Bhavani, Amaravathy and Noyyal arise from the Western Ghats and carry volumes of water to the deltaic district of Thanjavur since the beginning of recorded history.

Agreement of 1892

The first permanent agreement between the former Madras State and the former Princely State of Mysore on the utilization of the Cauvery waters was signed in 1892. It stipulated that no irrigation work should be constructed by Mysore on the scheduled streams without the concurrence and consent of the Madras State. If Mysore desired to construct any irrigation work on these streams, full details of the project should be furnished to the Madras State so that the latter could satisfy themselves that the prescriptive rights already acquired were not affected by the proposed works.

Agreement of 1924:

In 1909, the then Madras Government submitted proposals to the Government of India for the construction of a balancing reservoir across the River Cauvery in the Madras State at Mettur, which was proposed to irrigate an additional 3 lakhs of acres under the Cauvery within the overall scheme of supplies for pre-existing irrigation entitlements.

About the same time, Mysore formulated a reservoir project across the Cauvery at Krishnarajasagar for power generation at Sivasamudram as well as for extending irrigation in that State by 1,25,000 acres under the Cauvery and requested Madras for consent under the 1892 Agreement after furnishing the details of this project.

After prolonged negotiations, an agreement was entered into between Mysore and Madras in 1924, which was more or less in the nature of a supplement to the permanent Agreement 1892.

The following are the main features of the 1924 Agreement :

(a) Mysore was permitted to take up the Krishnarajasagar project to irrigate 1,25,000 acres, subject to the condition that the supplies due to Madras for irrigation purposes as laid down in the Agreement were first maintained. Only after these supplies to Madras were released, could impounding commence in the Krishnarajasagar reservoir.

(b) Madras was permitted under Clause 10 (IV) of the Agreement, to have the Mettur reservoir to irrigate an extra 3 lakhs acres under this project.

(c) Mysore was permitted further extension of irrigation, apart from Krishnarajasagar, for an extent of 1,10,000 acres under the Cauvery and its scheduled tributaries upto a capacity of 45 T.M.C. subject again to the condition that the supplies due to Madras under the rules and regulations agreed to for Krishnarajasagar were in no way affected or diminished. To ensure this, full details of any Mysore project should be furnished to Madras so that the latter could satisfy itself in this regard.

(d) Should Madras construct a reservoir across any of the tributaries of the Cauvery in Madras, Mysore would have the right to construct an off set reservoir of 60 per cent capacity of the Madras reservoir, subject to the condition that the supplies due

to Madras or Mysore under any of the preceding clauses of the Agreement should in no way be affected.

Following the Agreement, Mysore and Madras constructed the Krishnarajasagar and the Stanley reservoir in Mettur respectively. Mysore did not immediately thereafter extend irrigation to 1,10,000 acres through the reservoir upto 45 T.M.C as mentioned in condition (c) above through an off set reservoir. Madras constructed reservoirs across the Bhavani and the Amaravathy.

(e) Finally, there is a provision for review, on the expiry of 50 years (that is in 1974), of clauses 4 to 8 of the Agreement dealing with the utilization of surplus waters for further extension in both Mysore and Madras beyond what was contemplated in the Agreement, on a mutually acceptable basis and in the light of the experience gained in the working of the Agreement.

Tamil Nadu's dispute with Mysore :

Mysore has taken up the construction of certain major irrigation projects across the tributaries of Cauvery in their territory.

These projects may be divided broadly into three categories :

(a) Reservoirs to extend irrigation under clause 4 of the 1924 Agreement relating to extension of irrigation permitted for 1,10,000 acres through reservoirs upto 45 T.M.C. capacity. The Hemavathi project is being executed under this clause.

(b) Offset in lieu of the Bhavani and the Amaravathy projects of Tamil Nadu upto 60 per cent of capacity of the latter. These projects are being executed by Mysore across the Kabini and the Saraswathy.

(c) Extensions of irrigation under non-scheduled streams in Mysore.

Special mention must also be made in this connection of the major project now being executed by Mysore on the Harangi, a tributary of the Cauvery. The river was originally in the State of Coorg, which was not a party to the 1892 and 1924 Agreements. This project provides for extension of irrigation to about 75,000 acres, an area almost equal to what is permitted under the Cauvery and its tributaries in Mysore in clause 10 (IV) of the 1924 Agreement. According to Tamil Nadu Government, the Harangi reservoir project, if commissioned, will vitally affect the flows due to Tamil Nadu. On the other hand, Mysore claims that Harangi is a non-scheduled stream, which was not specifically listed in the 1892 Agreement, and that as such, Mysore is at liberty to utilize this tributary's waters as it pleases.

Negotiations :

Tamil Nadu had been negotiating with Mysore for more than a decade to reach accord on all outstanding issues ; but no settlement has reached. This was due to the fact that since 1960 Mysore has been having reservations regarding the 1924 Agreement. An open repudiation of the 1924 Agreement was made on the floor of the Mysore Assembly by the Mysore Chief Minister, who took the occasion to make it clear that the Mysore projects would be completed by 1972-73.

In February 1970, Tamil Nadu requested the Government of India to arrange for an immediate reference of the dispute to a Tribunal to be constituted under the provisions of the Inter-State Water Disputes Act, 1956.

The Government of India, however, desired to explore the possibilities of a settlement before taking this step and advised Tamil Nadu to agree to further discussions with Mysore at the Chief Ministers level. It was then pointed out to the Government of India that Tamil Nadu required the following essential pre-conditions to be fulfilled if negotiations with Mysore were to be at all meaningful: first, Mysore should agree to stop work on their projects pending further negotiations; secondly, Mysore should give a firm assurance to abide by the Inter-State Agreements of 1892 and 1924. The Government of India indicated to Tamil Nadu in reply that these two conditions would be squarely put to Mysore so that discussions with Mysore could be conducted only within the scope of the existing inter-State Agreements.

Four rounds of discussions among the Chief Ministers of Tamil Nadu, Mysore and Kerala[10] were held under the chairmanship of the Union Minister for Irrigation and Power. No agreement could, however, be reached in view of the total repudiation by Mysore of their obligations under the 1892 and 1924 Agreements

A final round of negotiations was held in Madras on 27th December 1970. But no understanding was arrived at.

When reports were received that Mysore was speeding up the projects, the Chief Minister of Tamil Nadu wrote to the Prime Minister about the deteriorating situation and the need for emergent action in order to protect the prescriptive rights of Tamil Nadu. At this stage, the Prime Minister requested the views of the Chief Minister of Tamil Nadu on a fresh proposal from the Chief Minister of Mysore for a further round of talks. This proposal was rejected by Tamil Nadu on the ground that the differences were basic and that no useful purpose would be served by further negotiations.

In July 1971 both the Houses of the Legislature in Tamil Nadu passed a unanimous resolution urging the Government of India to render justice by constituting a Tribunal under the Inter-State Water Disputes Act, 1956 and by referring to it the dispute between Tamil Nadu and Mysore in the interests of all the parties concerned.

But the Central Government did not move in the matter.

Proceedings before the Supreme Court

In August 1971, Tamil Nadu filed a suit under Article 131 of the Constitution[11] against the Union of India and the State of Mysore in connection with Cauvery water dispute. The suit is for a declaration by the Supreme Court that a dispute has arisen and exists between the Tamil Nadu and Union of India in regard to the omission on the part of the latter to constitute a tribunal under the Inter-State Water Disputes Act, 1956, and to refer to the Tribunal certain issues arising out of the State of Tamil Nadu's letters dated 17th February 1970 and 26th August 1970 to the Union of India regarding the Cauvery Water dispute with Mysore.

The Tamil Nadu Government also filed a petition for the issue of an interim injunction restraining the Mysore State from proceeding with the construction of Hemavathi and other projects concerned on Cauvery in Mysore State pending the disposal of the suit.

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10. Kerala was also invited to these discussions by the Government of India probably because the former raised a claim for the Cauvery waters in their capacity as successor State to Tamil Nadu.

11. Article 131 of the Constitution deals with the original jurisdiction of the Supreme Court in respect of any dispute between Centre and States etc.

The Mysore Government has filed objections before the Supreme Court. The main objections raised by Mysore are as follows :

(a) The suit is not for enforcing the Agreement of 1892 and 1924 that were entered into between the then States of Madras and Mysore on the utilization of Cauvery waters, but for compelling the Union of India to refer the dispute between Madras and Mysore to a Tribunal under the Inter-State Water Disputes Act.

(b) The Supreme Court has no jurisdiction to entertain or adjudicate upon any water dispute as the one raised by Tamil Nadu.

(c) Section 11 of the Inter-State Water Disputes Act read with Article 262 of the Constitution excludes the jurisdiction of the Supreme Court and of any other court in respect of any water dispute that may be referred to a tribunal under the Act.

(d) Tamil Nadu does not disclose "any present or imminent" threat of violation of any legal right amenable for adjudication in the suit. The mere fact that Mysore proceeds with the several projects which it has taken up, does not constitute a violation of any right of Tamil Nadu. It is only when these works are completed and there is a substantial diminution in the flow of water in the river consequent upon the excessive impounding of water in the reservoirs built by Mysore that Tamil Nadu can, if otherwise permissible, complain of its riparian rights being prejudicially affected. Furthermore, the dams or reservoirs by themselves constitutes no infringement of Tamil Nadu's rights and in the projects there are adequate provisions to regulate the quantity to be impounded and let down the stream in accordance with any decision touching the apportionment of Cauvery waters by the appropriate authority.

(e) The Agreement of 1892 and 1924 are not binding upon Mysore and there is nothing in any of the letters referred to by Tamil Nadu to suggest that Mysore feels bound by the terms and conditions of the Agreement of 1924.

A Constitution Bench of the Supreme Court has declined to grant interim injuction prayed for by Tamil Nadu. The main suit is still pending decision.

2. Shortcomings of the legal framework for settling inter-state water disputes

The Cauvery water dispute discloses, among others, the under mentioned shortcomings of the existing legal framework for settling inter-state water disputes.

It should be noted, first, that the Inter-State Water Disputes Act, 1956, confers a discretion on the Central Government to refer a dispute to the Tribunal. In the case of the Cauvery water dispute, the said discretion has not been exercised so far, even though the dispute has been pending for more than a decade. This would indicate the inffectiveness of the existing legal framework for settling such disputes speedily.

Secondly, even if a dispute is referred to a Tribunal, there appears to be a lacuna in the Inter-State Water Disputes Act, 1956, in that it does not contain any provision directing as to how the decision of the Tribunal given under the Act is to be implemented[12].

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12. See Report of the Centre-State Relations Enquiry Committee, p. 195, Government of Tamil Nadu (1971) This Report is hereinafter referred to as the Rajamannar Committee Report.

Thirdly, the Cauvery dispute mainly centres around the interpretation of the 1892 and 1924 Agreements. Such interpretation can best be given by the Supreme Court rather than by *ad hoc* tribunals constitued to settle disputes as and when such disputes arise.

Furthermore, the contentions of Tamil Nadu and Mysore in the Cauvery water dispute would also show that, as it is, there are uncertainties in the substantive principles governing the utilization of waters of interstate rivers. The *ad hoc* tribunals may not be in a position to resolve these uncertainties and evolve a body of principles best suited to the requirements of our growing society. The Supreme Court will be in a better position to do this.

IV SUGGESTIONS FOR IMPROVING THE MACHINERY FOR SETTLING INTERSTATE RIVER DISPUTES

The controvery whether the federal court or a body outside the federation such as an *ad hoc* body should have jurisdiction over interstate river disputes has been going on in India for the last four decades.

Prior to independence, such disputes were governed by Sections 130 to 133 of the Government of India Act, 1935. Where an action of one province in respect of an interstate river waters affected or was likely to affect prejudicially the interest of another province, the latter could lodge a complaint before the Governor General. After appointing a Commission of Investigation, the Governor General (and in certain cases His Majesty in Council) could make such orders as he considered proper in the matter, and such orders were binding on the province concerned. Provisions similar to Sections 130 to 133 of the Government of India Act, 1935, were included in the Draft Constitution. The Draft Constitution also contained a provision for obtaining the opinion of the Supreme Court on any question of law arising out of the report of the expert body. However, in the place of these provisions the present Article 262 was subsequently adopted. As noted earlier, Article 262 of the Constitution read with Section 11 of the Inter-State Water Disputess Act, 1956, confers jurisdiction over interstate river disputes on *ad hoc* tribunals appointed by Central Government at the request of the State Governments concerned.

It should be noted that in most of the Federations, the federal court has jurisdiction over such matters. For instance, in the United States of America, Article III Section 2 of the Constitution gives the Supreme Court original jurisdiction of actions in which States are parties. Under this provision, the Supreme Court decides controversies relating to interstate water disputes. In Australia, under Sections 75 and 76 of the Commonwealth of Australia Constitution Act, 1900, the High Court of Australia is competent to decide interstate disputes including those relating to interstate rivers. Similarly in Switzerland, the Swiss Federal Court has the power to adjudicate on inter-canton river water disputes. Thus, while in most of the federations the federal court is vested with this special original jurisdiction, there is no reason why such a procedure cannot be adopted in India also.

Furthermore, as stated earlier, there are uncertainties as regards the substantive principles that govern interstate water agreements and disputes, and the Supreme Court will be the most competent body to evolve common principles applicable to these disputes.

In this context, it should be mentioned that the Study Team of the Administrative Reforms Commission has expressed the fear that, if the Supreme Court is vested with this

jurisdiction, it would give its decisions mostly based on common law. As the Rajamannar Committee has rightly pointed out, this objection could be eliminated if the Constitution itself specifically provided that such disputes should be decided on the principle of apportioning supplies in the most equitable and economical manner[13].

Besides, under the Inter-State Water Disputes Act, 1956, the Central Government has discretion in referring any dispute relating to interstate water to a tribunal. The Cauvery water dispute has shown that the Central Government may, for its own reasons, inordinately delay the exercise of its discretion in the matter. This procedure might therefore inhibit much needed progress in the field of water resources development.

It is, therefore, suggested that the Supreme Court be vested with the jurisdiction over inter-state water disputes.

V SUGGESTION RELATING TO SUBSTANTIVE PRINCIPLES GOVERNING INTERSTATE WATER DISPUTES

Having dealt with the appropriate machinery for settling interstate river water disputes, the next question to consider is, what principles should be applied in resolving such disputes.

1. **Doctrine governing rights of coriparian States ;**

There are several doctrines governing the rights of corrparian States to use the waters of an interstate river, which are mentioned briefly below :

(a) *The Doctrine of Riparian Right* [14].

The common law doctrine of riparian rights entitles each owner of land bordering on a stream to have the waters thereof flow in the natural channel, unpolluted in quality and undiminished in quantity. Strictly interpreted, the doctrine would forbid any use of the waters of the stream. It was modified in England to recognize two uses—ordinary or natural including use for domestic and livestock purposes and extra-ordinary or artificial including use for irrigation and industrial purposes.

(b) *The Territorial Sovereignty Theory (The Harmon Doctrine)*

According to the theory of territorial sovereignty, a riparian State can do what it pleases with its waters without regard to its effect upon other coriparian States, and no riparian State has a right to demand continued flow of water from other States. This theory is of doubtful validity even at international level, and does not apply between units in a federation.

(c) *The Doctrine of Appropriation* [15].

The doctrine of appropriation had its rudiments in Roman Law and the Spanish and Mexican Law. This doctrine provides that any one who puts water to a beneficial use may take or appropriate it, and the right to continue to take it exists so long as the use continues provided that such use does not conflict with use by some one who made an earlier appropriation from the same source. "First in time", "first in right" is the classical statement of the appropriation doctrine.

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13. See Rajamannar Committee Report, p. 194.
14. See A.S. Wisdon, " The Law of Rivers and Water Courses", Shaw & Sons Ltd. (1962)
15. Roy E. Huffmann, " Irrigation Development and Public Water Policy", The Ronald Press Company, New York (1953)

In the United States of America, the appropriation doctrine has been adopted in all 17 of the arid and semi arid States. Eight States adopted the appropriation doctrine as the only basis of water rights; nine States adopted a hybrid appropriation-riparian doctrine. The exclusive appropriation system is called the "Colorado doctrine", and the twofold system is referred to as the "California doctrine".

(d) *The Doctrine of Equitable Apportionment.*

According to this doctrine, the waters of an interstate river should be apportioned considering the needs of each State. For applying this doctrine, it is necessary to balance and compromise the interests of all the riparian States. The Supreme Court of the United States of America has applied this doctrine to decide disputes relating to interstate water disputes[16].

(e) *Comments.*

It should be emphasized that in the law of interstate rivers there is clearly no place for any purely legal doctrine derived from any single abstract principle, whether that principle be absolute supremacy of the territorial sovereign or the old private law doctrine of riparian rights. The former is as essentially anarchic as the latter is obstructive. The former would permit every State to inflict irreparable injury upon its neighbour without being amenable to any control save the threat of war. The latter is essentially a right of veto. The doctrine of prior appropriationap pears to be particularly suitable to the peculiar conditions in the United States of America. It is for these reasons that the doctrine of equitable apportionment is gaining ground (at the international level) The doctrine of equitable apportionment is embodied also at the international level in the Helsinki Rules on the Uses of the Waters of International Rivers, 1966.

2. Law in India

(a) *The Doctrine of Riparian Rights*

So far as India is concerned, the common law doctrine of riparian rights is being applied as between individual riparian owners[17], but the doctrine does not apply in the allocation of the waters of an interstate river between the coriparian States.

(b) *The Harmon Doctrine inapplicable*

The Harmon doctrine was never applied in India. Under the Constitution, a coriparian State is not free to develop an inter state river regardless of the injury to other riparian States. This is borne out by Article 262 of the Constitution, which empowers Parliament to provide for the adjudication of disputes relating to interstate rivers and river basins.

(c) *The Doctrine of Prior Appropriation*

The American doctrine of prior appropriation is not also the accepted law in India.

(d) *The Doctrine of Equitable Apportionment*

On the other hand, the doctrine of equitable apportionment has been applied in the settlement of some interstate river water disputes.

In 1939, the Sind Province complained that contemplated diversions from the Indus River in the Province of Punjab would interfere with the existing uses in Sind. A com-

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16. See Wyoming V. Colorado, 259 U.S. 419 (1922); Nebraska V. Wyoming, 325 U.S. 589 (1945)

17. See Illustrations (h) and (j) to Section 7 of the Indian Easements Act, 1882.

mission, officially called the Indus Commission but generally referred to as the Rau Commission from the name of its chairman, Sir Benegal Rau, was established to hear the dispute. In an effort to facilitate an agreed settlement, the Commission obtained acceptance by the parties of the following principle :

> "If there is no......agreement, the rights of the several provinces and States must be determined by appliying the rule of 'equitable distribution', each unit getting a fair share of the water of the common rivers."[18]

The equitable apportionment doctrine has also been applied in the utilization of Mahi waters between Madhya Pradesh, Rajasthan and Gujarat.

(e) Comments

Even though the doctrine of equitable apportionment has not yet been codified into law in India, it is hoped that, because of its inherent merit and of its acceptanoe in the municipal laws of other federations as well as at the international level, this doctrine will be adopted as the substantive principle govering the subject in India.

VI SUGGESTIONS REGARDING THE MACHINERY TO BE USED FOR DEVELOPING WATER RESOURCES OF INTERSTATE RIVERS

In the preceding sections, suggestions have been made for improving the mechanism for settling interstate river water disputes and to indicate the substantial principles that should be used for settling such disputes.

An equally important matter to consider is the machinery that may be utilized to develop the water resources of interstate rivers.

1. Failure of the River Boards Act

As already pointed out, the River Boards Act, 1956, was enacted with a view to effect a cooperative approach in establishing the necessary coordination in the planning and operation of various developments in the interstate river basins. No such board was established, as the necessary coophration was not forthcoming from the States concerned. The idea of setting up River Boards was virtually abandoned and the Act remains a dead letter.

2. Limitations relating to interstate agreements

Another method for promoting cooperation between States is through interstate agreements. *But it is doubtful whether interstate agreements can provide a permanent solution to the needs of water in a dynamic society.* Such agreements providing for allocation of water of interstate rivers for irrigation and domestic and industrial uses may prove too rigid for easy adaptation to the social and economic development of contracting States. Changes in populations and increases in industrialization of certain areas within the same basin of an interstate river may create new demands which were not foreseen by the negotiations of the original agreement.

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18. Report of the Indus (Rau) Commission, 1942. pp. 10-11, quoted by Majorie M. Whitemann, "Digest of International Law, Vol. III, pp. 943-944, (1964)

3. Institution of Autonomous Corporations

Even though under the Constitution the construction of irrigation and power projects, big or small, is the right of the States, every State does not have the resources, financial and technical, for the proper planning and execution on the scale required by these huge projects. While not all States thus have the resources to undertake the construction of big multipurpose projects, most of them have developed a fairly competent machinery to manage the distribution of the benefits of the projects. They are adequately equipped to execute medium and small irrigation and power schemes. As an alternative to the States' inability to execute the big multipurpose projects efficiently, such projects should not be entrusted to the Centre either. The projects directly executed by the Centre have by no means set any perfect standards. On the other hand, the utter confusion and the wasting of several crores of rupees during the first five years of the Hirakud dam were said to be the direct consequence of attempting to build a project in Orissa far distant from Delhi.

Judging by experience so far, the institution of autonomous corporation has been the most efficient and productive instrument for the execution of big multipurpose projects.

The best example that we have in India of such corporation is the Damodar Valley Corporation (DVC), which was modelled on the Tennesse Valley Authority in the United States of America.

The autonomous character of the DVC came about more as an accident than by design. The difference of views between the two participating States of Bihar and West Bengal were so wide and so many that an autonomous corporation under an Act of Parliament was born out of compelling circumstances.

The most important features of the DVC are :

(a) The project covers the entire river system from sources to mouth in order to achieve the maximum possible benefits in terms of flood control, irrigation facilities, power development, navigation, water supply for industrial and domestic use, malaria control, fishery development, recreation etc.

(b) Similarly, the modern approach of integrated development of natural resources on a valley wide basis, covering the water as well as land resources, is being applied in the project.

(c) Lastly, this river valley project is being implemented through a regional development corporation.

Considering the success that has attended this project, it may be safely recommended, that where river development crosses State boundaries and is intended to stimulate general economic advancement, the machinery adopted should be that of an autonomous corporation on the model of the DVC.

* * * * * *

In the discussion of the paper at the Seminar chaired by Mr. M. S. Appa Rao, Publisher, Madras at which Tamil Nadu Government experts in Hydrology, Irrigation and Law were also present, in order to assist the Seminar a number of specific and general

issues were raised. The Mysore-Tamil Nadu Cauvery Waters Dispute being subjudice, was referred to only in illustration of certain principles such as appropriation rights. co-riparian rights, equity principles etc.

A first major issue discussed was the problems caused for economic development by interstate rivers. The first problem relates to the misuse of the river resources by one or other of the States leading to water scarcity or flooding or ecological disruption. The Cauvery dispute is a good illustration of this type of problem and Palar current situation is also felt to be a similar example. A second problem is with regard to lack of use of the water resources represented by interstate rivers. Here the west flowing rivers from Kerala are a good example of large hydrological resources which could be harnessed for use of the dry areas in Mysore and Tamil Nadu being allowed to go to wasts.

The various legal systems and doctrines outlined in the paper concerning water rights were discussed at length. It was pointed out that existing agreements on the sharing of water should be first enforced and respected if new agreements are to be negotiated for instance with Kerala and Andhra. On the other hand the current agreements have a historical background which is irrelevant to conditions to-day and therefore are called in question. Against this discussion there was general agreement that the existing laws and doctrines quoted in the paper have no relevance to laws of hydrology such as the technical problems of water flow, water seepage, underground water effects etc. It is therefore necessary to develop a legal framework which will be consonant with modern science and technology expressed in the laws of hydraulics and hydrology. In this connection it was recalled that law is resilient and can adapt itself to varying social and political systems.

A further issue debated relates to the concept of interstate rivers as national assets as embodied in the Constitution. From this point of view the past agreements on sharing of waters are of less significance than the optimisation of water use. For instance an area which is able to use optimally the water resources would have a prior claim to these resources than the land through which the river flows, if it is not using it. The concept of rivers as national assets also raises the question of the priority in their use to be given to neglected or backward areas. This means that the principle of optimality in the use of river waters will have to be balanced against that of priority to neglected or backward areas.

All this means that the decision making body with regard to interstate water disputes must have at its disposal engineers, scientists; hydrologists, economists as well as legal experts. From this point of view it is not clear why the paper gives priority to the Supreme Court as the deciding organ over the Water Disputes Tribunal provided for in the Act of 1956. The Supreme Court can only bring legal expertise to the question. It can be advised by scientists. However the Tribunal machinery had distinct advantages in that it can bring together a feeling of equality all the four groups involved.

In discussing interstate water developments in the future, there was a brief reference to the proposed Ganga-Cauvery National grid. The engineers present expressed grave technical doubts on the proposal as it relates to linking Ganga with Cauvery from the point of view of engineering and hydraulic feasibility. Questions were raised as to the amount of discharge water that would be needed, the rate of evaporation in the reservoirs and the power required for the whole scheme. In its place, the possibility of first linking

the Southern rivers and the Northern rivers should be explored. In view of the fact that the United Nations Team has given technical and engineering clearance to the proposed National grid, it was suggested that these views of the engineers should be forwarded both to the Union Minister and the United Nations Team, which is returning to India shortly.

Finally the proposal for future machinery in the paper was discussed It was suggested that a high level national river waters commission should be established to deal with modernising the legal framework and assisting the Tribunal in water disputes. This global approach is needed for the country to ensure that the laws of science and technology in this area are universally applied and followed. With regard to the operation of interstate river projects there should be the kind of decentralised working mechanisms such as proposed in the concluding section of the paper. They could be autonomous corporations or semi autonomous commissions or interstate agencies. They should not be centralised bodies which cannot operate local projects.

EDUCATION FOR ECONOMIC DEVELOPMENT *

ASSUMPTIONS :

In introducing the discussion, Education for Economic Development, I shall take as given three propositions :

First, I shall assume that economic development refers to

(a) the regeneration and improved performance of our agriculture including our forestry and fishery resources ;

(b) the spread of agro-based and other manufacturing activities and mining, appropriate to and needed by the country ;

(c) the continuing growth of our technical infra-structure of power, transport, water-supply, telecommunications, savings and investment net-work, distributive trades and an effectual administrative structure ;

(d) the expansion of the country's exports and appropriate imports with improving trade terms ; and

(e) the constant expansion and improvement of our human and social infra-structure which run through the education, training and science system, public health and nutrition, employment, housing and social development.

Second, I shall assume that the aim of economic development so delineated is to bring about a continuing increase and improvement in the living level of the poor majority which make up our countries. I define as the poor majority, the 70 per cent of our people who are living at or below the poverty line, which I define at 2,500 calorie consumption per person per day. It is to these our fellow citizens that economic development and its fruits are addressed.

Third, I shall take as given the results of all the many studies, theoretical and pragmatic which have been made in this country, my country and all countries, that conclusively demonstrate that under certain necessary and sufficient conditions, education promotes—personally I go further and say causes—economic development.

And so on the basis of these three propositions, I shall in the rest of the discussion address myself to the necessary and sufficient conditions under which education promotes—and as I said I hold, causes—economic development.

NECESSARY CONDITIONS : I set forth three necessary conditions for education to generate economic development.

Education is general formation : Education is the general formation at varying levels of generality and specialisation that is the necessary conditions for the skills to be acquired in the farm, factory or institution. Education is not skill acquisition, which comes later in the time sequence, but is the pre-condition to it. It does this through

* Extracts from the statement made by Dr. Malcolm S. Adiseshiah at the opening in January of the Education Sector Review, Addis Ababa, Ethiopea.

developing aptitudes to and capabilities for reasoning, reflection, analysis, experimentation and innovativeness and provides the frame for continuous learning—the capacity to learn where to learn and how to learn. This condition has a double implication on the educational components and on measuring educational attainments. The key components of education at the early stages are language fluency and competence, arithmetic and general science: at the middle education level more language, elementary and higher mathematics, sciences, social studies and specialised agricultural, agro-industrial and commercial formation: and at higher levels further generalised specialisation, terminating language concentration after two years at this stage, so that the rest can be subject centred. There is an equally necessary implication in the means of measuring educational attainments at various levels and forms through a system of assessment and evalution of such achievements of which our current examination system is a poor parody and even worse a dangerous mockery.

Education is a disaggregated sub-system: A second necessary condition is that the education system must be disaggregated to correspond to the skill demands of the economic system, which are themselves disaggregated. The present disaggregation of the school system is lumpy with the school stage being broken into 6+2+4 and the higher education being broken into 1+3+2. This kind of break-down has the sanctity of history and tradition and has pedagogic sense and educational consistency, when education is viewed as a closed self-contained system. But such a lumpy staging does not correspond to the skills hierarchy and demands of our economies. I at least attribute the dropping out of the majority from the educational system, which is as general as our humanity in all our poor countries, and as universal as to characterise education at all levels, not simply to poor teaching, irrelevant curricula, inadequate buildings and laboratory, library facilities and the drag and economic pull of the poverty leaden family but even more to the lumpiness of our educational systems. If we did have a disaggrated education system which corresponded to the skill demands of society, there will be a normal smooth flow through the system with entry and exit points at a number of stages. I am proposing in my State a 3+2+2+2+1 school staging and a 2+2+2 higher education staging as one means of making the education sub-system a part of the economic system which will also give full play to the hitherto neglected area of self-employment.

Education is functional to the economy: The third necessary condition is that the education system should be functional to the sector make up of our economies. Such functionalism has three expressions. First is the tie in with the sector break up of our economies. If our agriculture, forestry and fisheries contribute sixty per cent of the State product and employ 80 per cent of our work force and if the organised sub-sector in manufacturing mining and the services contribute 12 per cent and employ eight per cent of the work force, the education sub-system must be grounded in and correspond to this sectoral break up of the economy. It cannot be a repetition or even a local adaptation of the educational model of an economy where agriculture contributes 12 per cent of the State product and employs five per cent of the work force. Our educational sub-systems are based today on this model so that the entire educational process, particularly at the post primary level is dysfunctional, in the sense that it is almost wholly related to the 12 per cent from the view-point of product contribution, and 8 per cent in terms of employment opportunities and generation. Second is the correspondence between the

educational pyramid and the skills pyramid of each economic sub-sector. The skills pyramid of each sub-sector is unique and cannot be expressed in monolithic lineal terms. Where it is in the form of a triangle with a varyingly cut off summit and the education pyramid is usually in the form of an inverted rectangle there is the dysfunction that I have been talking about. The problem of correspondence between the two sets of pyramids takes us back to the general formation condition of education with which I started. Third functionalism calls for the kind of decentralised education structure and programming where every individual unit, within the general policy and pedagogic frame, can fashion its learning content, its diversification and streaming, its specialisation, and its technology of learning in relation to the local skills perspectives.

SUFFICIENT CONDITIONS: I turn now to list briefly what I regard as the three sufficient conditions for education to promote and cause economic development.

Education is a coherently merged system of school and out-of-school education: First education and training in school and out-of-school should be merged to form a single coherent system. The current gulf separating school and out-of-school education is both misleading and wasteful. In fact the educational process of pre-skill formation is continuous with the process of skill acquisition on the job and the two need to be indissolubly linked so that they may each reinforce and enrich the other. In place of using educational diplomas and certificates as a means of judging and deciding on employability as we currently do, such diplomas and certificates should be awarded at the end of the initial period of service on the job related to the particular stage of education. In fact certificates and diplomas should be diversified to refer simply to educational and in-service training attainments, carrying no automatic right, as they do today, as to the transferability to the next stage of education, which should have its own evaluation and testing entrance apparatus or to employability, which must depend as several other factors in addition to educational attainment—particularly in the importantly growing area, for our countries, of self-employment. If all this sounds too sophisticated for our poor countries, I will add that it is far less costly than the present dichotamised and fragmented education and training system and far less sophisticated than its current totality. I am proposing it in my State's poor economy. The merging of school education with in-service skill formation will make the education system a basic sufficient and integral sub-system of our economy.

Education is a continuing process of formation just as skill acquisition too is not a one shot affair: Second and as a consequence, the education system should extend to wherever an education can be had and however it can be had. Education is not the formation of the mind or the turn of the hand that can be had only within the four walls of that hallowed institution we call a school or between the years of five and 18 or through the sole medium of the book and the teacher. In our countries the pressures of mass poverty will make the majority of our school population leave the school stream continuously for work at home, in the field, factory or office, (when the majority act in this way, for me, it is the system which is wrong and has to be changed and not the people). It should be possible to develop a system in which they will not be simply and pejoratively written off as drop-outs but can continue their education in their homes, offices, factories, fields and institutions, using all the technologies available through correspondence courses, evening and night classes, radio and television instruction and

simple systems of programmed learning. Further in all occupations and functions particularly in agriculture and agro-based industries, new skills and new techniques are arising and exploding daily and there is need for everyone to be able to go back to school, college, research laboratory and training courses right through one's life in order to have his education updated and skill indirectly refurbished. Such a system called by various names in various countries, schools without walls, universities of the air, parallel education systems, should however be component parts of a coherent system of education, with the mobility and flexibility for the individual as a means of the contributing sufficiently to the continuous moving forward of the economy and an improvement in his own productivity and a rise in his income.

Education is financially a sub-system: Third, the State financing of education should be limited and concentrated on

(a) providing the basic minimum formation for all the people (which I personally place at as the equivalent of five years of schooling) with special appropriate shifts for those who leave the school stream after first two years, with special compensatory education for our poor majority who are first generation entrants into the system and with remedial education for those who have not had any education;

(b) Science and craft education, at all levels of the system;

(c) A man-power budgeted professional education, higher education and science research programmes which should include loan scholarships and earn while you learn facilities only for those from the poor families; (it is a curious paradox that this facility and tradition is totally absent in our poor countries where they are most needed and flourished in the rich countries);

(d) Out-of-school continuing education programmes particularly in the professional, vocational and science domains; and

(e) The training of teachers and the development of all the technologies of education.

All else should be finished by parents and the private sector in our countries who should buy education in the same way they buy other articles of consumption or industrial raw materials. I have computed that such a form of financing is sufficient to enable our education system to be just one step ahead of our economic system generally, and when fully developed to use effectively on allocation on 4–5 percent of the State product and a 16–18 per cent of the annual State budget.

Published as required under Section 19 D(b) of the P.R.B. Act
read with Rule 8 of the Registration of Newspapers (Central) Rules, 1956.

MADRAS DEVELOPMENT SEMINAR SERIES

Form IV.

1. *Place of Publication*	:	Madras.
2. *Periodicity of its Publication*	:	Monthly.
3. *Printer's Name*	:	Bro. Mani Mezhukanal.
Whether citizen of India	:	Yes.
Address	:	Director, St. Louis Institute, Canal Bank Road, Adyar, Madras - 20.
4. *Publisher's Name*	:	Dr. Malcolm S. Adiseshiah.
Whether citizen of India	:	Yes.
Address	:	Director, Madras Institute of Development Studies, 74, Second Main Road, Gandhinagar, Adyar, Madras - 20.
5. *Editor's Name*	:	Dr. Malcolm S. Adiseshiah,
Whether citizen of India	:	Yes.
Address	:	Director, Madras Institute of Development Studies, 74, Second Main Road, Gandhinagar, Adyar, Madras - 20.
6. *Names and addresses of individuals who own the Newspaper and partners and share-hlders holding more than one percent of the total capital.*	:	Madras Institute of Development Studies, Madras - 20, registered as a Charitable Trust under the Madras Charitable Trusts Act.
Trustees	:	Dr. Malcolm S. Adiseshiah, Mrs. Elizabeth Adiseshiah.

I, Malcolm S. Adiseshiah, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd./-

Date : (MALCOLM S. ADISESHIAH)

Signature of the Publisher.

Regd. No. M. 8831

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OF
DEVELOPMENT STUDIES
(M I D S)

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St. Louis Institute Press, Canal Bank Road, Adyar, Madras-20
Editor : Dr. Malcolm S. Adiseshiah